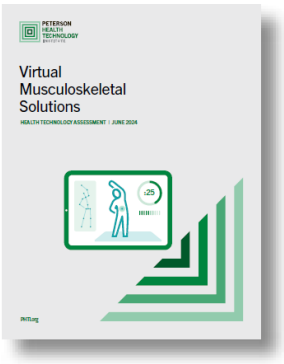
Virtual Musculoskeletal Solutions Evaluation — Appendices

June 2024 | Version 1.0

Accessing PHTI's Full Report

You can access the full report here.



PETERSON HEALTH TECHNOLOGY INSTITUTE

Appendix A – Methodology Overview

This evaluation of virtual MSK care solutions followed PHTI's standard process for stakeholder engagement and technology assessment. The assessment methodology is set forth in the ICER-PHTI Assessment Framework for Digital Health Technologies. Additional information about PHTI's process and advisors can be found at phti.org.

Assessment Framework

PHTI partnered with the Institute for Clinical and Economic Review (ICER), a leader in health technology assessment, to develop the ICER-PHTI Assessment Framework for Digital Health Technologies that will guide this and all other PHTI evaluations. The assessment framework prioritizes products' clinical benefits and economic impact, while also considering effects on health equity, data privacy, and security.

The selection process for which technologies are evaluated are based on several factors, including market relevance, disease burden, level of spend and claimed savings, and evidence quality and availability.

PHTI's goal is to provide decision-makers with relevant and valuable information to make effective decisions to improve overall performance and deliver better health outcomes at lower costs. By helping purchasers identify bright spots in digital health innovation, PHTI aims to raise the bar for technology-driven advances in healthcare delivery, including superior outcomes, convenience, access, and affordability. The assessment framework can also guide technology developers and investors about performance standards and the evidence needs required to demonstrate stated clinical and economic benefits.

Clinical Assessment

The Systematic Literature Review (SLR), including online database searches, data screening and extraction, and evidence quality ratings, was conducted by a third-party Health Technology Assessment partner to identify all relevant published literature evaluating clinical impact of virtual PT solutions for musculoskeletal (MSK) disorders. The SLR was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This SLR followed the methods and standard set forth in the ICER-PHTI Assessment Framework to provide a rigorous evaluation of digital health technologies. The SLR was registered a priori with PROSPERO (registration number CRD42023469911).

Data from two literature databases, MEDLINE and EMBASE, were systematically searched for inclusion into the SLR. Conference proceedings were hand-searched to retrieve relevant publications. Potentially eligible studies were identified via the search strategy outlined in Tables 1 and 2 below. Studies were considered for inclusion in the SLR based on the population, intervention, comparators, outcomes, timing, and setting/study design (PICOTS) criteria presented in Table 3 below.

The SLR included a review of the "grey" literature, which captured data from sources not indexed es that are available from scientific conferences, the US Food and Drug Administration (FDA) website, company websites, and information provided by companies under review. Conference proceedings were hand-searched for abstracts of interest for the last three years, including the American College of Sports Medicine Annual, and the American Congress of SLR evaluation.

Table 1. Medline Search Strategy

SEARCH	TERMS	CITATIONS
#1: Physical therapy and management	"physical therapy modalities"[MeSH] OR physical therapy[Text Word] OR "Rehabilitation"[MeSH] OR physiotherapy[Text Word] OR "exercise therapy"[Text Word] OR "Exercise Therapy/methods"[MeSH] OR "Physical Therapy Specialty"[MeSH] OR "orthopedic rehabilitation"[tiab] OR "pain management"[MeSH Terms] OR pain management[Text Word]	449,806
#2: Artificial Intelligence and Applications	"Artificial Intelligence"[Mesh] OR "Mobile Applications"[Mesh] OR "AI"[tiab] OR "AI enabled"[tiab:~0] OR "artificial intelligence"[tiab:~0] OR "mobile applications"[MeSH Terms] OR mobile application[Text Word] OR "sensor guided"[Text Word] OR "digital care program"[tiab:~0] OR "digital health technology"[tiab:~0] OR "DHT"[tiab] OR 'telemedicine'[MeSH] OR "digital care program"[tiab:~0] OR "wearable*"[tiab]	321,326
#3: Clinical indications	("Musculoskeletal Diseases"[MeSH] OR "musculoskeletal disorder*"[tiab] OR "musculoskeletal condition*"[tiab] OR "musculoskeletal pain"[Text Word]) OR ("Low Back Pain"[Mesh] OR "CLBP"[tiab] OR "chronic pain"[tiab:~0] OR "Low Back Pain/prevention and control"[Mesh] OR "Low Back Pain/rehabilitation"[MeSH] OR "Low Back Pain/therapy"[Mesh]) OR ("neck pain"[MeSH Terms] OR neck pain[Text Word]) OR ("Patellofemoral Pain Syndrome"[MeSH]) OR ("hip pain"[Text Word]) OR ("shoulder pain"[MeSH Terms] OR shoulder pain[Text Word]) OR (("neck" OR "shoulder" OR "knee" OR "Low back" OR "chronic low back" OR "musculoskeletal" OR "chronic" OR "hip") AND ("pain"))	1,434,972
#4: Combination	#1 AND #2 AND #3	1,038
#5: Study Type Exclusions	#4 NOT ("case reports"[pt] OR “case report”[tiab] OR comment[pt] OR editorial[pt] OR review[pt] OR "clinical trial protocol"[pt])	836
#6: Human studies	#5 NOT ("Animals"[MeSH] NOT "Humans"[MeSH])	829
#7: Date filter	2013-2023	714
#8: Language filter	English	**703**

Table 2. Embase Search Strategy

SEARCH	TERMS	CITATIONS
#1: Physical therapy	'Physiotherapy'/exp OR 'physiotherapy':ti,ab OR 'physical therapy':ti,ab OR 'Rehabilitation'/exp OR 'kinesiotherapy'/exp OR 'exercise therapy':ti,ab OR 'orthopedic rehabilitation':ti,ab	675,321
#2: Artificial Intelligence and Mobile Applications	'digital care':ti,ab OR 'digital health technology':ti,ab OR 'digital health care program':ti,ab OR 'digital health':ti,ab OR 'artificial intelligence'/exp OR 'ai enabled':ti,ab OR 'ai-enabled':ti,ab OR 'artificial intelligence':ti,ab OR 'mobile application'/exp OR 'mobile application':ti,ab OR 'sensor guided':ti,ab OR 'telemedicine'/exp OR 'wearable device' OR 'wearable sensor' OR 'lidar'	196,665
#3: Clinical indications	('Musculoskeletal Diseases'/exp OR 'musculoskeletal disorder':ti,ab OR 'musculoskeletal condition':ti,ab OR 'musculoskeletal pain'/exp) OR ('low back pain'/exp OR 'neck pain'/exp OR 'knee pain'/exp OR 'hip pain'/exp OR 'shoulder pain'/exp OR (('low back' OR 'neck' OR 'knee' OR 'hip' OR 'shoulder'):ti,ab AND ('pain':ti,ab))	2,933,212
#4: Combination	#1 AND #2 AND #3	1,250
#5: Study Type Exclusions	#4 NOT ('case report'/it OR 'comment'/it OR 'editorial'/it OR 'letter'/it OR 'review'/it OR 'clinical trial protocol'/it)	1,021
#6: Human studies	#5 NOT (('animal'/exp OR 'nonhuman'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'in vitro study'/de) NOT 'human'/exp)	1,020
#7: Date filter	2013-2023	944
#8: Language filter	English	**923**

Table 3. PICOTS Inclusion and Exclusion Criteria

Criteria	Inclusion criteria	Exclusion criteria
Population	• Adults living with musculoskeletal conditions or disorders, specifically low back, knee, hip, shoulder, or neck pain	• Pediatric population • Adults living with any other musculoskeletal conditions or disorders or non-musculoskeletal conditions or disorders • Post/peri-surgical or -operative patients
Intervention(s)	• Virtually enabled PT with/without AI that is part of an active care plan • Dario • Hinge • Kaia • Limber • Omada • RecoveryOne • Sword • Vori	• Virtually enabled PT without a real-time feedback loop and that is not part of an active care plan
Comparator(s)	• In-person PT • Standard of care • Usual care • No PT	N/A
Outcomes	• Physical function • Pain (self-reported) • Condition-specific pain measures	N/A

	• Disability (e.g., Oswestry disability index)
	• Anxiety and/or depression
	• Safety of DHT
	• Work productivity and activity impairment
	• Physical activity engagement
	• User experience
	  ○ Engagement level
	  ○ Patient satisfaction
	• Adherence or program completion
	• DHT-driven shifts in care delivery
	• Healthcare resource utilization (office visit, emergency department visit, surgery)
	• Prescription medication use (e.g., opioids)
	• Caregiver burden
	• Health equity
	  ○ Accessibility
	  ○ Access and distribution	

Study Design	• Randomized controlled trials • Observational studies • Systematic reviews and meta-analyses	• Commentary, opinion, study protocols • Non-systematic and narrative reviews • Case reports or series
Geography	• Global	• Interventions not approved or available in the United States
Data Sources	• Databases: MEDLINE (via PubMed) and EMBASE • Conferences: ACSM Annual and ACRM Annual • Grey literature: Company website and U.S. FDA website	N/A
Date of Publication	• Databases: 2013–2023 • Conferences: 2021–2023	N/A
Language	• English	N/A

Notes. PT = Physical Therapy; AI = Artificial Intelligence; DHT = Digital health technology; N/A = Not Applicable.

Screening

All publications identified by the systematic literature searches were reviewed against the predefined selection criteria. Study selection followed a two-stage screening process based on the review of titles and abstracts (stage I) and full-text articles (stage II). Following completion of title/abstract review, all full texts of publications identified for inclusion during this stage were retrieved for further review. Title/abstract and full-text screening were conducted by two independent investigators with any disagreements resolved by discussion with a third independent investigator if needed. All screening was conducted using DistillerSR software, which provides a platform where articles retrieved from the database searches can be organized and screened using customizable entry forms. During both screening stages, abstracts and articles were excluded based on the following criteria:

1. Population out of scope
2. Intervention out of scope
3. Study design or publication type out of scope
4. Outcomes out of scope (Applied only during full text screening phase.)
5. Articles published in language other than English

For conference abstracts where no poster could be located and for database abstracts without a full text available, studies were screened based on the available information within the abstract.

Data Extraction

Data were extracted by one investigator with quality assurance against the original source publication completed by another independent investigator. Table 4 lists the reported data captured for each included study.

Table 4. Data Collected

Study Information
Study identifier or trial name
Publication citation
Study type
Source of data
Timeframe of data collection
Geography
Patient Information
Specific population[a]
Sample size
Age
Sex (male, female)
Body mass index
Race/ethnicity
Income
Interventions
DHT intervention
Standard of care
Usual care
Active care plan
Unit of service (AI-enabled app or platform, wearable, platform)
Outcomes[b, c]
Physical function
Pain (self-reported)
Condition specific pain measures
Disability (eg, Oswestry disability index)
Anxiety and/or depression
Safety of DHT
Work productivity impairment
Physical activity engagement
User experience
• Engagement level
• Patient satisfaction

Adherence or program completion
DHT-driven shifts in care delivery
HCRU (office visit, ED visit, surgery)
Prescription medication use (e.g. opioids)
Caregiver burden
Health equity
• Accessibility • Access and distribution

Key: AI – artificial intelligence, DHT – digital health technology, ED – emergency department, HCRU – healthcare resource utilization.
[a] low back, knee, shoulder, and neck pain; chronic vs acute.
[b] Will include mean, median, and/or effect estimates as reported, along with corresponding uncertainty measures (eg, 95% confidence interval)
[c] If outcomes are reported across multiple timepoints, results will be captured separately.

Evidence Quality Assessment

All included randomized controlled trials (RCTs) were assessed for potential bias using the Cochrane Collaboration Risk of Bias in Randomized Trials Version 2 (RoB2).[1] The RoB2 includes a maximum of 22 questions that considers the following domains:

Domain 1: Risk of bias arising from the randomization process

Domain 2: Risk of bias due to deviations from the intended interventions (effect of assignment or adherence to intervention)

Domain 3: Missing outcome data

Domain 4: Risk of bias in measurement of the outcome

Domain 5: Risk of bias in selection of the reported result

Possible ROB2 ratings are shown in Table 5.

Table 5. Risk of Bias Categories for RoB2

Overall risk of bias judgement	Criteria
Low risk of bias	The trial is judged to be at low risk of bias for all domains for this result.
Some concerns	The trial is judged to raise some concerns in at least one domain for this result, but not to be at high risk of bias for any domain.
High risk of bias	The trial is judged to be at high risk of bias in at least one domain for this result. OR The trial is judged to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

Note: RoB2 = risk of bias in randomized trials version 2.

Results from non-randomized studies were assessed using the Newcastle-Ottawa Scale (NOS).[2] Studies were evaluated for multiple criteria within 3 categories: selection of groups, comparability of groups, and either exposure or outcome, depending on the type of study. Possible NOS ratings are shown in Table 6.

Table 6. Risk of Bias Rating Using NOS

Rating	Description
++	All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter.
+	Some of the checklist criteria have been fulfilled, where they have not been fulfilled or not adequately described, the conclusions are unlikely to alter.
-	Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

Note: NOS = Newcastle Ottawa Scale.

For ease of interpretation, scales from the two Risk of Bias tools were converted to a single scale: Low, Moderate, High. “Low” refers to original ratings of “Low Risk of Bias” (ROB2) or “Good Study Quality” (NOS); “Moderate” refers to original ratings of “Some Risk of Bias” (ROB2) or “Fair Study Quality” (NOS); “High” refers to original ratings of “High Risk of Bias” (ROB2) or “Poor Study Quality” (NOS).

ICER-PHTI Assessment Framework Evidence Standards: The body of research that comprised the clinical effectiveness section was assessed for meeting the minimum evidence requirements necessary to comment on an outcome based on the level of risk that the digital intervention presents to a user. The interventions in this report qualify as Tier 3 according to the ICER-PHTI Assessment Framework because they provide information that would be used in consultation with a medical professional. While best research methods call for a randomized controlled trial, given the limited risk of harm to patients from these virtual MSK interventions, we consider any evidence meeting the minimum standards for Tier 3.

Evidence Evaluation Approach

A number of important decisions had to be made in order to systematically evaluate and interpret this body of evidence for produce meaningful evaluations most relevant to our key audience, purchasers. These decisions were made by PHTI with input from expert advisors in the healthcare space, clinical advisors, and patients. The methodological decisions are presented below.

Virtual MSK Interventions: All the solutions evaluated incorporate physical therapy associated with a mobile or web application to guide therapeutic workflows. The therapeutic workflows themselves vary considerably: live interactions with a licensed physical therapist to guide aspects of diagnosis and therapy; computer vision or AI-enabled hardware-guided feedback on patient exercise quality; and/or interaction with a range of clinical and non-clinical personnel to guide therapy.

Comparator Interventions: Virtual MSK interventions are compared to in-person physical therapy or to usual care, which may include a range of treatments options (e.g., educational materials provided to patient, over the counter medications, icing and rest) or no treatment at all. This assessment prioritizes studies that include comparators to in-person physical therapy under usual usage conditions to account for cases that would have self-resolved without intervention.

Outcome Measures: The primary outcome measures of clinical effectiveness are pain and function. Secondary outcomes include work productivity & activity, mental health status (e.g., depression, anxiety), and measures that assess patients’ user experience, adherence, as well as health equity factors (e.g., Social Deprivation Index).

Minimally Important Clinical Differences (MCID): There are a wide range of clinical scales that are used to report outcome measures. They reflect differences in research versus non-research environments, validated scales used for specific parts of the body, and pragmatic choices that are common in practice and reported as part of real-world studies. However, as a result, it can be difficult to interpret the meaning of what a few points or percentage differences between an intervention and comparator group implies. Based upon the input of our clinical advisors, guidance from within studies, and external references, the report defines the MCID for a range of pain and function scales. Because most readers are less familiar with the specific clinical scales and scores, and because comparisons across different scales is challenging, we evaluate study findings both in terms of meeting statistical significance and MCID.

Comparability as a Clinical Threshold: Because the primary use-case for virtual MSK solutions is as a replacement to in-person PT, which has a strong evidence base, the primary clinical threshold is comparability in performance (i.e., improvements in pain/function by virtual MSK solutions are as good as those observed by in-person PT).

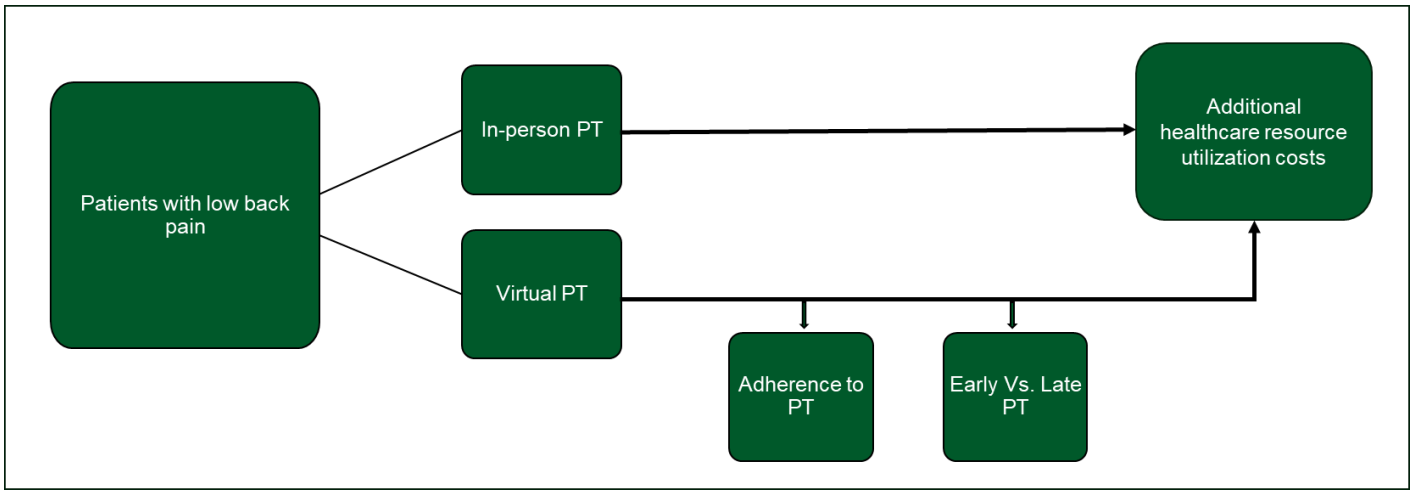
User Experience and Health Equity: Because a core claim of virtual MSK solutions is their benefit toward patient engagement and access (key contributors to intervention success), we separately track measures related to user experience (adherence, engagement, and satisfaction) and health equity (differential performance in key sociodemographic sub-groups).

Economic Assessment

We developed a *de novo* budget impact analysis for virtual MSK solutions for US adults with low back pain. The time horizon was 1 year in the base case, with results for 2 years presented as a separate scenario analysis. In a hypothetical US health plan with 1,000,000 members, a closed cohort approach was used, in which eligible patients initiated virtual PT or usual care and were followed until the end of the time horizon. Our analysis estimates the budget impact of virtual PT assuming 25% displacement of usual care (i.e., market share of 25%). Given lack of available data specific to each company, the model focused on a single hypothetical virtual PT program using the best available data to inform model inputs.

The budget impact model schematic is presented in Figure 1. Patients enter the model and receive usual care in the scenario without virtual PT, or a mix of usual care and virtual PT in the scenario with virtual PT reimbursed. The budget impact is the difference in costs between these two scenarios. Based on available data, the base case model focuses on the costs of delivering in-person PT vs virtual PT; scenario analyses were conducted to explore the impact of virtual PT on adherence and time to initiating PT. Further details on cost inputs are presented below.

Figure 1: Budget Impact Model Schematic



Notes: PT = physical therapy.

Intervention: The intervention in the budget impact analysis was a hypothetical virtual PT program.

Comparator: The comparator for this analysis was in-person PT.

Results: The budget impact analysis reports the following results across commercial, Medicare, and Medicaid populations:

- Total costs for virtual PT and usual care scenarios
- Incremental cost per user per month (PUPY)
- Incremental cost per health plan member per month (PMPM)

Scenario Analysis: The following scenario analyses were included in the analysis:

- Virtual PT-enabled shifts to early and adherent PT and effects on subsequent healthcare resource use
- Virtual PT pricing scenario using remote therapeutic monitoring (RTM) billing codes

Model Assumptions and Limitations:

- The budget impact model only considers lower back pain-specific population and costs.
- 25% of patients seeking PT would participate in virtual PT.
- In-person PT costs were estimated assuming 8 visits per year.[3]
- Virtual PT shifts to earlier and more adherent PT are assumed values; the baseline distribution of adherence and time to PT are based on a published claims analysis.[4]
- Where needed, health plan-specific costs were derived by multiplying costs identified in the literature by published Medicare to Medicaid and Medicare to Commercial cost ratios.[5,6]
- Estimates of healthcare resource use costs for virtual PT were taken from studies published in the in-person PT setting; costs may differ in the virtual PT setting.

Analysis Inputs

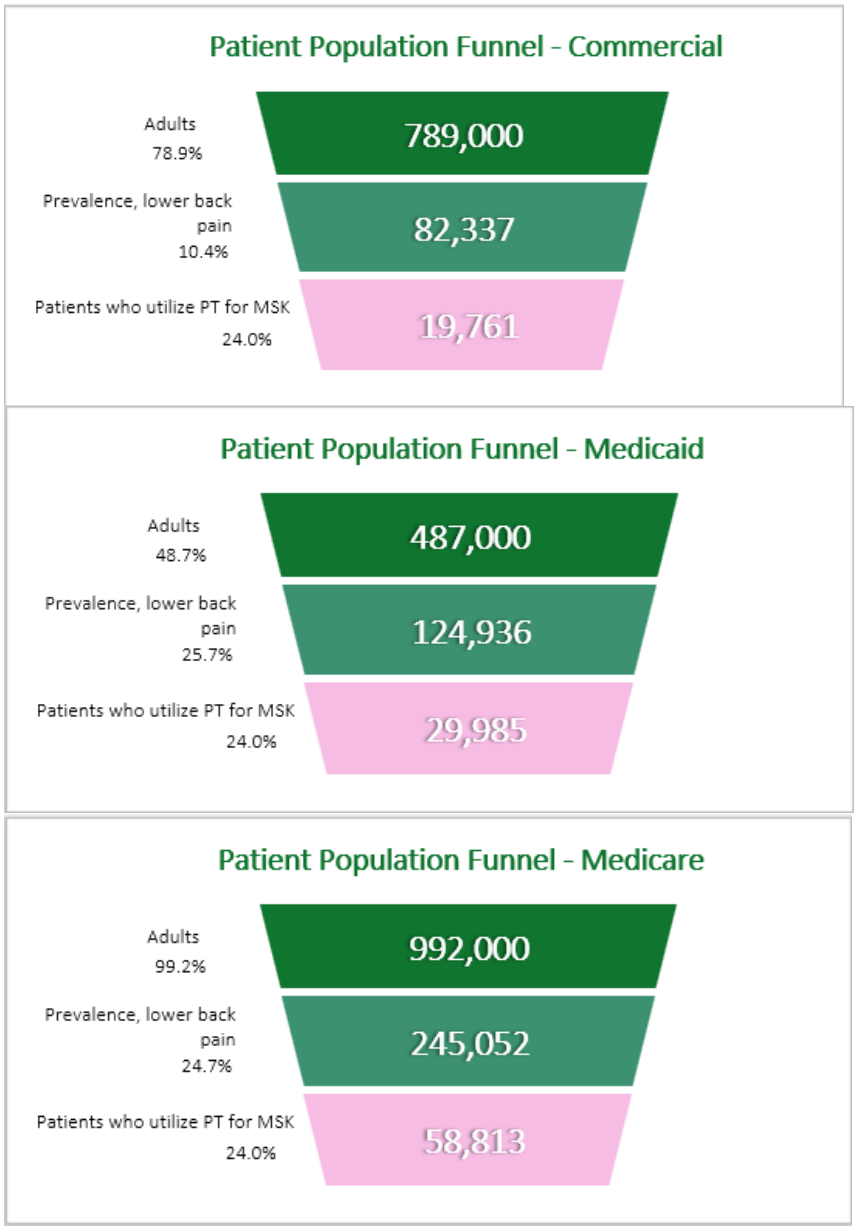
Patient Population: The eligible patient population for the analysis was US adults with lower back pain who are seeking PT. It is estimated that 13.1% of adults suffer from low back pain annually, including 10% with commercial insurance, 25% of Medicare enrollees, and 26% of adults in the Medicaid population.[7] Plan-specific prevalence for a 1,000,000-member health plan was derived using the point prevalence of 13.1% in the Shmagel analysis, and recalculating the prevalence based on the proportion of those with lower back pain with each type of insurance plan (61.1%, 13.2% and 14.1% in the commercial, Medicare and Medicaid plans, respectively) as reported in table 2 of the study. We then divided the prevalence by the insurance plan type as reported for the total cohort in the Shmagel analysis for a 1,000,000-member health plan (767,000, 70,000, and 72,000 in the commercial, Medicare and Medicaid plans, respectively).[8] Patient population funnel inputs are presented in Table 7. The patient funnel diagram is presented in Figure 2.

Table 7: Eligible Population Inputs

Criteria	Commercial	Medicare	Medicaid	Source
Plan population	1,000,000	1,000,000	1,000,000	Assumption
Proportion of plan that is adults	78.9%	99.2%	48.7%	American Community Survey 2022
Prevalence of lower back pain	10.4%	24.7%	25.7%	Shmagel et al. 2016[9]
Patients who utilize PT for lower back pain	24.0%	24.0%	24.0%	Sharpe et al. 2021[10]

Notes: MSK = musculoskeletal conditions; PT = physical therapy.

Figure 2: Population Funnels for a 1 Million-Member Health Plan



Notes: MSK = musculoskeletal conditions; PT = physical therapy.

Cost: Cost inputs for the budget impact analysis were informed by a targeted literature review. All inputs were inflated from the source to 2023 U.S. dollars where needed using the annual Consumer Price Index for medical care.[11] For each perspective, Commercial to Medicare[12] and Medicare to Medicaid[13] payment rate conversions for inpatient and outpatient services were applied to the source cost to reflect the cost input for each payer perspective. These ratios are presented in Table 8.

Table 8: Health Plan Cost Conversions

Health Plan	Inpatient Services	Outpatient Services	Source
Medicare to Commercial	240%	182%	Congressional Budget Office[14]
Medicare to Medicaid	78%	70%	Commonwealth Fund[15]

Usual Care Costs: Unit costs for in-person PT visits were collected to inform annual costs for usual care. Costs were collected from the Centers for Medicare and Medicaid Services (CMS)[16] Physician Fee Schedule using the following Current Procedural Terminology (CPT) codes:

97110: Therapeutic exercises to develop strength, endurance, range of motion and flexibility ($29.82)
97530: Therapeutic activities ($37.62)
97112: Neuromuscular reeducation ($34.23)

Additionally, we included the cost of a one-time PT assessment visit reimbursed at $101.66 using CPT code 97161. Assuming 8 visits per year based on an analysis done by Chen et al.[17], the annual cost of in-person PT used in the model was $915 from the Medicare perspective ($1,665 and $641 from the commercial and Medicaid perspective, respectively).

Virtual PT Costs: Virtual PT costs were modeled using three pricing scenarios ($575, $995, and $1,144) per year based on a range of prices for unlimited sessions (i.e., maximum fees) from commercially available virtual MSK products.

The budget impact model included a scenario analysis to price virtual PT interventions that are RTM-augmented PT, which charge RTM codes in addition to ongoing in-person PT billing. RTM billing is estimated at $571 in commercial coverage, $314 in Medicare, and $220 in Medicaid (if covered in the state), which was added onto the in-person PT annual costs.

Accounting only for the lower cost of PT, virtual MSK solutions in the physical therapist-guided category have the potential to reduce healthcare spending in commercial insurance for eligible users relative to in-person PT (see Table 9). Savings range from an estimated $521 (31%) per person in the high solution price scenario to $1,090 (65%) per person in the low solution price scenario. Given lower reimbursement rates in Medicare, the negotiated prices for these solutions must be priced at less than $915 per person to achieve savings—meaning that both the middle and high pricing scenarios would increase overall healthcare spending when directly substituting virtual MSK solutions for in-person PT. In Medicaid, fee-for-service PT reimbursement is low such that only the low-price scenario for virtual MSK solutions would provide cost savings on an annual basis (an estimated $66 or 10% savings).

Table 9: PT Pricing and Annual Spending Impact of Shifting from In-Person PT to Physical Therapist-Guided Solutions (No Healthcare Resource Utilization Savings Included)

	Commercial	Medicare	Medicaid
Annual Spending for In-Person PT	$1,665	$915	$641
Change in Annual Spending Per User ($)			
High Solution Price: $1,144	-$521	$229	$503
Middle Solution Price: $995	-$670	$80	$354
Low Solution Price: $575	-$1,090	-$340	-$66
Annual Savings Per User (%)			
High Solution Price: $1,144	-31%	25%	78%
Middle Solution Price: $995	-40%	9%	55%
Low Solution Price: $575	-65%	-37%	-10%

Notes. Solution price refers to the maximum annual price charged for virtual MSK solutions. Negative numbers represent increased healthcare savings from switching to virtual MSK solutions.

Healthcare Resource Use Costs: The base case analysis focuses on the costs of delivering virtual PT vs in-person PT. Next, we added the impact on low back pain healthcare resource use costs based on time to initiating PT and adherence to PT.

Using data from the Military Health System Management Analysis and Reporting Tool, Childs et al. 2015[18] analyzed the costs and healthcare utilization of patients presenting to a primary care setting with lower back pain on the basis of time to PT referral and adherence to PT guidelines. In the analysis, initiating PT within 14 days was considered "early" and initiation after 14 days was considered delayed. Categorization of adherent PT was based on the mix of CPT codes utilized for each visit as described in Fritz et al. 2012.[19] Table presents the distribution and costs associated with each categorization of in-person PT based on their analysis. These 2-year costs were converted to 1-year costs to align with the model's time horizon of 1 year, assuming a 50%-50% split between costs incurred in the first and second year. In the scenario analysis using a 2-year time horizon, we used the total costs reported in the study.[20]

Table 10: Cost and Distribution of In-person PT, Commercial Perspective[21]

In-person PT	Early Adherent	Early Non-adherent	Delayed Adherent	Delayed Non-adherent
Distribution of care	24%	34%	19%	23%
Total lower back pain costs*	$1,181	$1,377	$1,892	$2,132

*Inflated from 2015 to 2023 US dollars.

Based on the distribution and costs from Childs et al., the annual healthcare resource use associated with lower back pain for patients receiving in-person PT was calculated to be $1,601 in a commercial plan. These costs were assumed to be in addition to the direct cost of receiving in person PT detailed above. This is based on the Childs study methodology which collected ICD codes for additional physician visits, imaging, injections, surgery, emergency department visits, and medication use to summarize total lower back pain costs for each cohort. We thus assumed PT visits were not included in these summary costs.

For the Physical therapist-guided solutions, we assumed a 50% shift in the timing and adherence for the virtual PT arm. For the RTM-augmented PT solutions, we assumed a 90% shift in adherence but no change in timing of initiating PT. Notably, these scenarios may be aspirational as suitable evidence pertaining to virtual PT improving timing and adherence vs in-person PT was not identified in the SLR.

Appendix B – Complete SLR and Company-Submitted Citations

Appendix B-1 – 48 Citations Included in SLR

Citation	Citation Type	Study Category	Data Source	Full Citation
DARIO HEALTH				
No citations identified				
HINGE HEALTH				
Bailey 2020	Full Text	O	Online Databases & Conference Proceedings	Bailey JF, Agarwal V, Zheng P, et al. Digital Care for Chronic Musculoskeletal Pain: 10,000 Participant Longitudinal Cohort Study. *J Med Internet Res*. 2020;22(5):e18250. doi:10.2196/18250
Mecklenburg 2018	Full Text	I	Online Databases & Conference Proceedings	Mecklenburg G, Smittenaar P, Erhart-Hledik JC, Perez DA, Hunter S. Effects of a 12-Week Digital Care Program for Chronic Knee Pain on Pain, Mobility, and Surgery Risk: Randomized Controlled Trial. J Med Internet Res. 2018;20(4):e156. doi:10.2196/jmir.9667
Shebib 2019	Full Text	I	Online Databases & Conference Proceedings	Shebib R, Bailey JF, Smittenaar P, et al. Randomized controlled trial of a 12-week digital care program in improving low back pain. NPJ Digit Med. 2019;2:1.
Smittenaar 2017	Full Text	O	Online Databases & Conference Proceedings	Smittenaar P, Erhart-Hledik JC, Kinsella R, Hunter S, Mecklenburg G, Perez D. Translating Comprehensive Conservative Care for Chronic Knee Pain Into a Digital Care Pathway: 12-Week and 6-Month Outcomes for the Hinge Health Program. JMIR Rehabil Assist Technol. 2017;4(1):e4. doi:10.2196/rehab.7258
Wang 2021	Full Text	O	Online Databases & Conference Proceedings	Wang G, Bailey JF, Yang M, Krauss J. Older Adult Use and Outcomes in a Digital Musculoskeletal (MSK) Program, by Generation. Front Digit Health. 2021;3:693170. doi:10.3389/fdgth.2021.693170
Wang 2022a	Full Text	O	Online Databases & Conference Proceedings	Wang G, Yang M, Hong M, Krauss J, Bailey JF. Clinical Outcomes After a Digital Musculoskeletal Program for Acute and Subacute Pain: Observational, Longitudinal Study With Comparison Group. JMIR Rehabil Assist Technol. 2022;9(2):e38214. doi:10.2196/38214
Wang 2022b	Full Text	O	Online Databases & Conference Proceedings	Wang G, Yang M, Hong M, Krauss J, Bailey JF. Clinical outcomes one year after a digital musculoskeletal (MSK) program: an observational, longitudinal study with nonparticipant comparison group. BMC Musculoskelet Disord. 2022;23(1):237. doi:10.1186/s12891-022-05188-x

Citation	Citation Type	Study Category	Data Source	Full Citation
Wang 2023	Full Text	O	Online Databases & Conference Proceedings	Wang G, Lu L, Gold LS, Bailey JF. Opioid Initiation Within One Year After Starting a Digital Musculoskeletal (MSK) Program: An Observational, Longitudinal Study with Comparison Group. J Pain Res. 2023;16:2609-2618. doi:10.2147/JPR.S412081
Hong 2022	Full Text	O	Company data submission	Hong M, Topete M, Yang M, Bailey JF. Effects of a Digital Musculoskeletal Acute Care Program on Chronic Pain Prevention: An Observational Study with Nonparticipant Comparison Group. J Pain Res. 2022;15:3605-3613. Published 2022 Nov 17. doi:10.2147/JPR.S385134
KAIA HEALTH				
Priebe 2020	Full Text	I	Company website	Priebe JA, Haas KK, Moreno Sanchez LF, et al. Digital Treatment of Back Pain versus Standard of Care: The Cluster-Randomized Controlled Trial, Rise-uP. J Pain Res. 2020;13:1823-1838. Published 2020 Jul 17. doi:10.2147/JPR.S260761
Toelle 2019	Full Text	I	Online Databases & Conference Proceedings	Toelle TR, Utpadel-Fischler DA, Haas KK, Priebe JA. App-based multidisciplinary back pain treatment versus combined physiotherapy plus online education: a randomized controlled trial. NPJ Digit Med. 2019;2:34. doi:10.1038/s41746-019-0109-x
LIMBER HEALTH				
Gruner 2021	Full Text	I	Online Databases & Conference Proceedings	Gruner MP, Hogaboom N, Hasley I, et al. Prospective, Single-blind, Randomized Controlled Trial to Evaluate the Effectiveness of a Digital Exercise Therapy Application Compared With Conventional Physical Therapy for the Treatment of Nonoperative Knee Conditions. Arch Rehabil Res Clin Transl. 2021;3(4):100151. doi:10.1016/j.arrct.2021.100151
OMADA HEALTH				
Beresford 2022a	Full Text	O	Online Databases & Conference Proceedings	Beresford L, Norwood T. Can Physical Therapy Deliver Clinically Meaningful Improvements in Pain and Function Through a Mobile App? An Observational Retrospective Study. Arch Rehabil Res Clin Transl. 2022;4(2):100186. doi:10.1016/j.arrct.2022.100186
Beresford 2022b	Full Text	O	Company-provided Data	Beresford L, Norwood T. The Effect of Mobile Care Delivery on Clinically Meaningful Outcomes, Satisfaction, and Engagement Among Physical Therapy Patients: Observational Retrospective Study. JMIR Rehabil Assist Technol. 2022;9(1):e31349. Published 2022 Feb 2. doi:10.2196/31349
RECOVERYONE				
Bray 2021	Abstract/ Poster	I	Online Databases & Conference Proceedings	Bray J. Impact of using an Online Interactive Rehabilitation Program for Low Back Pain Compared with Traditional Physical Therapy: A Pilot Study. Archives of Physical Medicine and Rehabilitation. 2021;102(4):13.

Citation	Citation Type	Study Category	Data Source	Full Citation
SWORD HEALTH				
Areias 2022	Full Text	O	Online Databases & Conference Proceedings	Areias AC, Costa F, Janela D, et al. Long-Term Clinical Outcomes of a Remote Digital Musculoskeletal Program: An Ad Hoc Analysis from a Longitudinal Study with a Non-Participant Comparison Group. Healthcare (Basel). 2022;10(12):2349. doi:10.3390/healthcare10122349
Areias 2023a	Full Text	O	Online Databases & Conference Proceedings	Areias AC, Janela D, Molinos M, et al. Managing Musculoskeletal Pain in Older Adults Through a Digital Care Solution: Secondary Analysis of a Prospective Clinical Study. *JMIR Rehabil Assist Technol*. 2023;10:e49673. doi:10.2196/49673
Areias 2023b	Full Text	O	Online Databases & Conference Proceedings	Areias AC, Costa F, Janela D, et al. Impact on productivity impairment of a digital care program for chronic low back pain: A prospective longitudinal cohort study. *Musculoskelet Sci Pract*. 2023;63:102709. doi:10.1016/j.msksp.2022.102709
Areias 2023c	Full Text	O	Company website	Areias AC, Molinos M, Moulder RG, et al. The potential of a multimodal digital care program in addressing healthcare inequities in musculoskeletal pain management. NPJ Digit Med. 2023;6(1):188. Published 2023 Oct 10. doi:10.1038/s41746-023-00936-2
Costa 2022a	Full Text	O	Online Databases & Conference Proceedings	Costa F, Janela D, Molinos M, et al. Impacts of Digital Care Programs for Musculoskeletal Conditions on Depression and Work Productivity: Longitudinal Cohort Study. J Med Internet Res. 2022;24(7):e38942. Published 2022 Jul 25. doi:10.2196/38942
Costa 2022b	Full Text	O	Online Databases & Conference Proceedings	Costa F, Janela D, Molinos M, et al. Digital Rehabilitation for Acute Low Back Pain: A Prospective Longitudinal Cohort Study. J Pain Res. 2022;15:1873-1887. doi:10.2147/JPR.S369926
Costa 2022c	Full Text	O	Online Databases & Conference Proceedings	Costa F, Janela D, Molinos M, et al. Telerehabilitation of acute musculoskeletal multi-disorders: prospective, single-arm, interventional study. BMC Musculoskelet Disord. 2022;23(1):29. Published 2022 Jan 4. doi:10.1186/s12891-021-04891-5
Cui 2023	Full Text	I	Online Databases & Conference Proceedings	Cui, D., Janela, D., Costa, F. et al. Randomized-controlled trial assessing a digital care program versus conventional physiotherapy for chronic low back pain. npj Digit. Med. 6, 121 (2023). https://doi.org/10.1038/s41746-023-00870-3
Janela 2022a	Full Text	O	Online Databases & Conference Proceedings	Janela D, Costa F, Molinos M, et al. Asynchronous and Tailored Digital Rehabilitation of Chronic Shoulder Pain: A Prospective Longitudinal Cohort Study. J Pain Res. 2022;15:53-66. Published 2022 Jan 8. doi:10.2147/JPR.S343308
Janela 2022b	Full Text	O	Company-provided Data	Janela D, Costa F, Areias AC, et al. Digital Care Programs for Chronic Hip Pain: A Prospective Longitudinal Cohort Study. Healthcare (Basel). 2022;10(8):1595. Published 2022 Aug 22. doi:10.3390/healthcare10081595

Citation	Citation Type	Study Category	Data Source	Full Citation
Janela 2023	Full Text	O	Online Databases & Conference Proceedings	Janela D, Costa F, Molinos M, et al. Fear Avoidance Beliefs in Upper-Extremity Musculoskeletal Pain Conditions: Secondary Analysis of a Prospective Clinical Study on Digital Care Programs. Pain Med. 2023;24(4):451-460. doi:10.1093/pm/pnac149
Pak 2023	Full Text	I	Online Databases & Conference Proceedings	Pak SS, Janela D, Freitas N, et al. Comparing Digital to Conventional Physical Therapy for Chronic Shoulder Pain: Randomized Controlled Trial. J Med Internet Res. 2023;25:e49236. doi:10.2196/49236
Scheer 2022	Full Text	O	Online Databases & Conference Proceedings	Scheer J, Costa F, Molinos M, et al. Racial and Ethnic Differences in Outcomes of a 12-Week Digital Rehabilitation Program for Musculoskeletal Pain: Prospective Longitudinal Cohort Study. J Med Internet Res. 2022;24(10):e41306. doi:10.2196/41306
Scheer 2023a	Full Text	O	Online Databases & Conference Proceedings	Scheer J, Areias AC, Molinos M, et al. Engagement and Utilization of a Complete Remote Digital Care Program for Musculoskeletal Pain Management in Urban and Rural Areas Across the United States: Longitudinal Cohort Study. JMIR Mhealth Uhealth. 2023;11:e44316. doi:10.2196/44316
Scheer 2023b	Full Text	O	Online Databases & Conference Proceedings	Scheer JK, Costa F, Janela D, et al. Sleep Disturbance in Musculoskeletal Conditions: Impact of a Digital Care Program. J Pain Res. 2023;16:33-46. doi:10.2147/JPR.S394421
VORI HEALTH				
Woznica 2023	Full Text	O	Online Databases & Conference Proceedings	Woznica DN, Milligan M, Krymis H, Peters KC, O'Connor MI, Grant RA. Telemedical Interdisciplinary Care Team Evaluation and Treatment of People With Low Back Pain: A Retrospective Observational Study. Arch Rehabil Res Clin Transl. 2023;5(3):100269. doi:10.1016/j.arrct.2023.100269
OTHER				
Bates 2023	Full Text	I	Online Databases & Conference Proceedings	Bates NA, Huffman A, Goodyear E, et al. Physical clinical care and artificial-intelligence-guided core resistance training improve endurance and patient-reported outcomes in subjects with lower back pain. Clin Biomech (Bristol, Avon). 2023;103:105902. doi:10.1016/j.clinbiomech.2023.105902
Chen 2021	Full Text	SLR	Online Databases & Conference Proceedings	Chen T, Or CK, Chen J. Effects of technology-supported exercise programs on the knee pain, physical function, and quality of life of individuals with knee osteoarthritis and/or chronic knee pain: A systematic review and meta-analysis of randomized controlled trials. J Am Med Inform Assoc. 2021;28(2):414-423. doi:10.1093/jamia/ocaa282
Cottrell 2017	Full Text	SLR	Online Databases & Conference Proceedings	Cottrell MA, Galea OA, O'Leary SP, Hill AJ, Russell TG. Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: a systematic review and meta-analysis. Clin Rehabil. 2017;31(5):625-638. doi:10.1177/0269215516645148

Citation	Citation Type	Study Category	Data Source	Full Citation
Delgado 2023	Full Text	O	Online Databases & Conference Proceedings	D Delgado A, Salazar SI, Rozaieski K, Putrino D, Tabacof L. Engagement in an mHealth-Guided Exercise Therapy Program Is Associated With Reductions in Chronic Musculoskeletal Pain. Am J Phys Med Rehabil. 2023;102(11):984-989. doi:10.1097/PHM.0000000000002257
Fan 2022	Full Text	SLR	Online Databases & Conference Proceedings	Fan I, Govil D, Semciw A. The effectiveness of exercise based digital health interventions (requiring internet) in management of hip and knee osteoarthritis: a systematic review and meta-analysis. Osteoarthritis and Cartilage. 2022;30:S402.
Fritz 2022	Full Text	O	Online Databases & Conference Proceedings	Fritz JM, Minick KI, Brennan GP, et al. Outcomes of Telehealth Physical Therapy Provided Using Real-Time, Videoconferencing for Patients With Chronic Low Back Pain: A Longitudinal Observational Study. Arch Phys Med Rehabil. 2022;103(10):1924-1934. doi:10.1016/j.apmr.2022.04.016
Gava 2022	Full Text	SLR	Online Databases & Conference Proceedings	Gava V, Ribeiro LP, Barreto RPG, Camargo PR. Effectiveness of physical therapy given by telerehabilitation on pain and disability of individuals with shoulder pain: A systematic review. Clin Rehabil. 2022;36(6):715-725. doi:10.1177/02692155221083496
Lara-Palomo 2022	Full Text	SLR	Online Databases & Conference Proceedings	Lara-Palomo IC, Gil-Martínez E, Ramírez-García JD, et al. Efficacy of e-Health Interventions in Patients with Chronic Low-Back Pain: A Systematic Review with Meta-Analysis. Telemed J E Health. 2022;28(12):1734-1752. doi:10.1089/tmj.2021.0599
Lentz 2023	Full Text	I	Online Databases & Conference Proceedings	Lentz TA, Coffman CJ, Cope T, et al. If you Build it, Will they Come? Patient and Provider Use of a Novel Hybrid Telehealth Care Pathway for Low Back Pain [published online ahead of print, 2023 Sep 26]. Phys Ther. 2023;pzad127. doi:10.1093/ptj/pzad127
Seron 2021	Full Text	SLR	Online Databases & Conference Proceedings	Seron P, Oliveros MJ, Gutierrez-Arias R, et al. Effectiveness of Telerehabilitation in Physical Therapy: A Rapid Overview. Phys Ther. 2021;101(6):pzab053. doi:10.1093/ptj/pzab053
Skolasky 2022	Full Text	O	Online Databases & Conference Proceedings	Skolasky RL, Kimball ER, Galyean P, et al. Identifying Perceptions, Experiences, and Recommendations of Telehealth Physical Therapy for Patients With Chronic Low Back Pain: A Mixed Methods Survey. Arch Phys Med Rehabil. 2022;103(10):1935-1943. doi:10.1016/j.apmr.2022.06.006
Suso-Martí 2021	Full Text	SLR	Online Databases & Conference Proceedings	Suso-Martí L, La Touche R, Herranz-Gómez A, Angulo-Díaz-Parreño S, Paris-Alemany A, Cuenca-Martínez F. Effectiveness of Telerehabilitation in Physical Therapist Practice: An Umbrella and Mapping Review With Meta-Meta-Analysis. Phys Ther. 2021;101(5):pzab075. doi:10.1093/ptj/pzab075
Tabacof 2022	Full Text	SLR	Online Databases & Conference Proceedings	Tabacof L, Baker TS, Durbin JR, et al. Telehealth treatment for nonspecific low back pain: A review of the current state in mobile health. PM R. 2022;14(9):1086-1098. doi:10.1002/pmrj.12738

Citation	Citation Type	Study Category	Data Source	Full Citation
Thompson 2023	Full Text	SLR	Online Databases & Conference Proceedings	Thompson D, Rattu S, Tower J, Egerton T, Francis J, Merolli M. Mobile app use to support therapeutic exercise for musculoskeletal pain conditions may help improve pain intensity and self-reported physical function: a systematic review. J Physiother. 2023;69(1):23-34. doi:10.1016/j.jphys.2022.11.012
Werneke 2022	Full Text	O	Online Databases & Conference Proceedings	Werneke MW, Deutscher D, Hayes D, Grigsby D, Mioduski JE, Resnik LJ. Is Telerehabilitation a Viable Option for People With Low Back Pain? Associations Between Telerehabilitation and Outcomes During the COVID-19 Pandemic. Phys Ther. 2022;102(5):pzac020. doi:10.1093/ptj/pzac020
Xie 2021	Full Text	SLR	Online Databases & Conference Proceedings	Xie SH, Wang Q, Wang LQ, Wang L, Song KP, He CQ. Effect of Internet-Based Rehabilitation Programs on Improvement of Pain and Physical Function in Patients with Knee Osteoarthritis: Systematic Review and Meta-analysis of Randomized Controlled Trials. J Med Internet Res. 2021;23(1):e21542. doi:10.2196/21542
Yang 2023	Full Text	SLR	Online Databases & Conference Proceedings	Yang Y, Li S, Cai Y, et al. Effectiveness of telehealth-based exercise interventions on pain, physical function and quality of life in patients with knee osteoarthritis: A meta-analysis. J Clin Nurs. 2023;32(11-12):2505-2520. doi:10.1111/jocn.16388

I = Interventional study. O = Observational study. SLR = Systematic Literature Review.

Appendix B-2 – 26 Company-specific Citations Excluded from SLR

Source	Full Citation	Reason for Exclusion	Details on Reason for Exclusion
DARIO HEALTH (Upright)			
Company website	Stuart S, Godfrey A, et al. (2019). Staying UpRight in Parkinson's disease: a novel postural intervention. Conference: 5th World Parkinson's Congress	Population out of scope	Parkinson's disease patients
Company website	Harvey, R.H., Peper, E., Mason, L. et al. Effect of Posture Feedback Training on Health. Appl Psychophysiol Biofeedback 45, 59–65 (2020).	Population out of scope	Healthy participants without MSK pain
Company website	James K. Effects of the Upright™ posture training program on spinal angles and self-esteem. Electronic Theses and Dissertations. 2018. http://hdl.handle.net/2346/73813	Intervention out of scope	Posture correction intervention
HINGE HEALTH			
Company data submission	Lu L, Gold LS, Koenig KM et al. Digital Musculoskeletal Program Is Associated With Decreased Joint Replacement Rates. Am J Manag Care. 2024;30(4):e103-e108.	Publication date	Published after SLR analysis was completed
Company data submission	Hong M, Loeb J, Yang M, Bailey JF. Postoperative Outcomes of a Digital Rehabilitation Program After Total Knee Arthroplasty: Retrospective, Observational Feasibility Study. JMIR Form Res 2022;6(9):e40703.	Population out of scope	Post-operative patients
Company data submission	Amirdelfan K, Hong M, Tay B, Reddy S, Reddy V. High-Frequency Impulse Therapy for Treatment of Chronic Back Pain: A Multicenter Randomized Controlled Pilot Study. J Pain Res. 2021;14:2991-2999.	Intervention out of scope	High frequency impulse therapy
KAIA HEALTH			
Company website	Jain D, Norman K, Werner Z, Makovoz B, Baker T, Huber S. Using Postmarket Surveillance to Assess Safety-Related Events in a Digital Rehabilitation App (Kaia App): Observational Study. JMIR Hum Factors. 2021 Nov 9;8(4):e25453.	Intervention out of scope	No explicit mention of active care plan with provider interactions
Company website	Priebe JA, Utpadel-Fischler D, Toelle TR. Less Pain, Better Sleep? The Effect of a Multidisciplinary Back Pain App on Sleep Quality in Individuals Suffering from Back Pain - a Secondary Analysis of App User Data. J Pain Res. 2020 May 20;13:1121-1128.	Intervention out of scope	No explicit mention of active care plan with provider interactions
Company website	Clement I, Lorenz A, Ulm B, Plidschun A, Huber S. Implementing Systematically Collected User Feedback to Increase User Retention in a Mobile App for Self-Management of Low Back Pain: Retrospective Cohort Study. JMIR Mhealth Uhealth. 2018 Jun 6;6(6):e10422.	Intervention out of scope	No explicit mention of active care plan with provider interactions
Company website	Huber S, Priebe JA, Baumann KM, Plidschun A, Schiessl C, Tölle TR. Treatment of Low Back Pain with a Digital Multidisciplinary Pain Treatment App: Short-Term Results. JMIR Rehabil Assist Technol. 2017 Dec 4;4(2):e11.	Intervention out of scope	Patients were instructed to use app on their own without provider interactions

LIMBER HEALTH			
Company data submission	Redacted	Pre-publication work	--
OMADA HEALTH			
Company data submission	Chen F, Siego CV, Jasik CB, et al. The Value of Virtual Physical Therapy for Musculoskeletal Care. American Journal of Managed Care. 2023;29(6):e169-e175.	Outcome out of scope	Simulation model for cost analysis
Company data submission	Mulcahy J, Delarosby A, Beresford L. Defying Stereotypes: Older Adults as Highly Engagers in App-Based Telehealth Physical Therapy. Topics in Geriatric Rehabilitation. 2023	Population out of scope	Post-operative patients
RECOVERY ONE			
Company Website	Anderson L, Kinsman S, Oberlander M. Postoperative Compliance and Return to Work After Rotator Cuff Repair: Value of an Interactive Online Rehabilitation Program Among Patients Treated Under Workers' Compensation. Orthopedics, 2021;44(2):e197–e202.	Population out of scope	Post-surgical patients
SWORD HEALTH			
Company data submission	Bento VF, Cruz VT, Ribeiro DD, Cunha JP. The vibratory stimulus as a neurorehabilitation tool for stroke patients: proof of concept and tolerability test. NeuroRehabilitation. 2012;30(4):287-293.	Population out of scope	Stroke patients
Company data submission	Correia FD, Molinos M, Luís S, et al. Digitally Assisted Versus Conventional Home-Based Rehabilitation After Arthroscopic Rotator Cuff Repair: A Randomized Controlled Trial. Am J Phys Med Rehabil. 2022;101(3):237-249.	Population out of scope	Post-surgical patients
Company data submission	Correia FD, Molinos M, Neves C, et al. Digital Rehabilitation for Acute Ankle Sprains: Prospective Longitudinal Cohort Study. JMIR Rehabil Assist Technol. 2021;8(3):e31247.	Population out of scope	MSK disorder type (ankle pain)
Company data submission	Correia FD, Nogueira A, Magalhães I, et al. Digital Versus Conventional Rehabilitation After Total Hip Arthroplasty: A Single-Center, Parallel-Group Pilot Study. JMIR Rehabil Assist Technol. 2019;6(1):e14523.	Population out of scope	Post-surgical patients
Company data submission	Correia FD, Nogueira A, Magalhães I, et al. Home-based Rehabilitation With A Novel Digital Biofeedback System versus Conventional In-person Rehabilitation after Total Knee Replacement: a feasibility study. Sci Rep. 2018;8(1):11299.	Population out of scope	Post-surgical patients
Company data submission	Correia FD, Nogueira A, Magalhães I, et al. Medium-Term Outcomes of Digital Versus Conventional Home-Based Rehabilitation After Total Knee Arthroplasty: Prospective, Parallel-Group Feasibility Study. JMIR Rehabil Assist Technol. 2019;6(1):e13111.	Population out of scope	Post-surgical patients
Company data submission	Correia FD, Santos F, Branquinho A, et al. Motor Task Performance under Visual and Auditory Feedback Post Stroke: A Randomised Crossover Trial. Int J Neurorehabilitation. 2017;4:5.	Population out of scope	Stroke patients
Company data submission	Costa F, Janela D, Molinos M, et al. Digital rehabilitation for hand and wrist pain: a single-arm prospective longitudinal cohort study. Pain Rep. 2022;7(5):e1026.	Population out of scope	MSK disorder type (hand/wrist pain)

Company data submission	Cruz VT, Bento V, Ruano L, et al. Motor task performance under vibratory feedback early poststroke: single center, randomized, cross-over, controlled clinical trial. Sci Rep. 2014;4:5670.	Population out of scope	Stroke patients
Company data submission	Janela D, Costa F, Molinos M, et al. Digital Rehabilitation for Elbow Pain Musculoskeletal Conditions: A Prospective Longitudinal Cohort Study. Int J Environ Res Public Health. 2022;19(15):9198.	Population out of scope	MSK disorder type (elbow pain)
Company data submission	Tedim Cruz V, Bento VF, Ribeiro DD, Araújo I, Branco CA, Coutinho P. A novel system for automatic classification of upper limb motor function after stroke: an exploratory study. Med Eng Phys. 2014;36(12):1704-1710.	Population out of scope	Stroke patients
VORI HEALTH			
Company data submission	Naidu I, Ryvlin J, Videlefsky D, et al. The Effect of a Multidisciplinary Spine Clinic on Time to Care in Patients with Chronic Back and/or Leg Pain: A Propensity Score-Matched Analysis. J Clin Med. 2022;11(9):2583.	Intervention out of scope	Participants did not receive virtual PT

Appendix C – Risk of Bias Ratings for SLR Citations

Appendix C-1: Risk of Bias Ratings using the Cochrane Collaboration Risk of Bias in Randomized Trials Version 2 (ROB2)

Citation	Overall rating	Random sequence generation	Deviation from intended intervention bias	Missing outcome data	Outcomes measurement bias	Selective reporting
HINGE HEALTH						
Mecklenburg 2018	**High**	Some	High	Low	High	High
Shebib 2019	**High**	Some	Some	Low	High	High
KAIA HEALTH						
Priebe 2020	**High**	Some	High	Low	Some	High
Toelle 2019	**High**	High	Some	Low	Some	High
LIMBER HEALTH						
Gruner 2021	**Some**	Some	Some	Low	Some	Low
SWORD HEALTH						
Cui 2023	**Some**	Low	Some	Low	Some	Some
Pak 2023	**Some**	Low	Some	Low	Some	Some
OTHER						
Bates 2023	**High**	Low	High	Low	Some	Low
Lentz 2023	**High**	Low	Some	Low	High	Low

Key: Low, Some, or High risk of bias. See Appendix A for detailed rating information.

Appendix C-2: Risk of Bias Ratings using the Newcastle-Ottawa Scale (NOS)

Citation	Overall rating	Group Selection	Group Comparability	Outcome/Exposure Assessment
HINGE HEALTH				
Hong 2022	**Fair**	+++	+	++
Wang 2022a	**Poor**	++		+
Wang 2022b	**Poor**	++	+	+
Wang 2023	**Fair**	+	+	+++
Bailey 2020	**Poor**	+	N/A	+++
Wang 2021	**Poor**	+	N/A	+++
Smittenaar 2017	**Poor**	+	N/A	+++
OMADA HEALTH				
Beresford 2022a	**Poor**	+	N/A	++
Beresford 2022b	**Poor**	+	N/A	++
SWORD HEALTH				
Areias 2022	**Fair**	+++		+++
Areias 2023a	**Poor**	+	N/A	+++
Areias 2023b	**Poor**	+	N/A	+++
Areias 2023c	**Poor**	+	N/A	+++
Costa 2022a	**Poor**	+	N/A	+++
Janela 2023	**Poor**	+	N/A	+++
Scheer 2022	**Poor**	+	N/A	+++
Scheer 2023b	**Poor**	+	N/A	+++
Costa 2022b	**Poor**	+	N/A	+++
Costa 2022c	**Poor**	++	N/A	+++
Janela 2022a	**Poor**	+	N/A	+++
Janela 2022b	**Poor**	+	N/A	+++
Scheer 2023a	**Poor**	+	N/A	+++
VORI HEALTH				
Woznika 2023	**Fair**	++	N/A	+++
OTHER				
Skolasky 2022	**Poor**	++	N/A	++
Delgado 2023	**Poor**	++	N/A	++
Werneke 2022	**Fair**	++	N/A	+++
Fritz 2022	**Fair**	++	N/A	+++

N/A = not applicable. Key: More + indicates better evidence quality/lower risk of bias. See Appendix A for detailed rating information.

Appendix D – Pain Outcomes in SLR

Appendix D-1: Numerical Pain Rating Scale (NPRS) in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
KAIA HEALTH												
Priebe 2020	C	NPRS	3 months	Acute low back pain	Kaia Health	680	5.22 (1.71)	3.37 (2.35)	33.3%; p<0.001	19% (<0.001)[1]	NR	NR
					Control	261	5.21 (1.74)	4.02 (2.19)	14.3%; p<0.001	reference	NR	NR
Toelle 2019	C	NPRS	12 weeks	Acute & chronic low back pain	Kaia Health	42	5.10 (1.07)	2.70 (1.51)	-2.40[1]; p<0.01	-0.39 (n.s.)[1]	NR	NR
					Control	44	5.41 (1.15)	3.40 (1.63)	-2.01[1]; p<0.01	reference	NR	NR
SWORD HEALTH												
Cui 2023	ITT	NPRS	8 weeks	Chronic low back pain	Sword Health	70	median 5.40 (95% CI 4.59, 6.02)	median 3.59 (95% CI 0.86, 2.71)	median -1.81 (-3.51, -0.25); p<0.001	median 0.30 (0.666)	NR	NR
					Control	70	median 5.49 (95% CI 5.05, 5.94)	median 3.38 (95% CI 2.71, 4.05)	median -2.11 (-2.82, -1.49); p<0.001	reference	NR	NR
Pak 2023	ITT	NPRS	8 weeks	Chronic shoulder pain	Sword Health	41	median 4 (IQR 3)	median 2.1 (95% CI 1.9, 2.3)	median -2.00 (-2.2, -1.8); p<0.001	median 0.9 (<0.001)	NR	NR
					Control	41	median 5 (IQR 3)	median 1.5 (95% CI 1.4, 1.7)	median -2.9 (-3.2, -2.6); p<0.001	reference	NR	NR

OTHER												
Bates 2023[2]	C	NPRS	8 weeks	Low back pain	Control	9	3.0 (1.5)	2.7 (1.6)	-0.3; p≥0.15 [1]	reference	NR	NR
					Training	13	3.6 (2.5)	3.3 (2.8)	-0.3; p≤0.05 [1]	0 [1]	NR	NR
					Clinical	27	2.8 (1.3)	2.0 (1.7)	-0.8; p=0.06 [1]	0.5 [1]	NR	NR
					Combined Treatment	20	2.8 (1.8)	2.5 (1.9)	-0.3; p=0.06 [1]	0 [1]	NR	NR

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, MCID – minimally clinically important difference, NPRS – numeric pain rating scale, NR – not reported, OR – odds ratio, SD – standard deviation. 1. Calculated. 2. Control arm: no treatment; Training arm: supervised artificial-intelligence-guided core-focused resistance training; Clinical arm: clinical care; Combined Treatment: both clinical care and artificial-intelligence-guided training.

Appendix D-2: Numerical Pain Rating Scale (NPRS) in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SE)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
SWORD HEALTH												
Areias 2022	ITT	NPRS	12 weeks	Chronic MSK pain	Sword Health	427	4.40 (95% CI 4.19, 4.61)	2.19 (95% CI 1.99, 2.39)	NR	NR	NR	NR
			1 year		Sword Health	427	4.62 (SE 0.14)	NR	-2.43 (0.16); p=0.008	-0.65 (NR)1	NR	1.86 (<0.001)
					Control	440	4.84 (SE 0.10)	NR	-1.78 (0.11); p<0.001	reference	NR	reference
	C	NPRS	1 year	Chronic MSK pain	Sword Health	310	4.57 (SE 0.20)	NR	-2.38 (1.94); p<0.001	NR	NR (71.6)	1.90 (0.002)
					Control	150	4.79 (SE 0.17)	NR	-1.79 (1.43); p<0.001	NR	NR (57.3)	reference
Areias 2023a	ITT	NPRS	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	4.48 (1.9)	1.90 (95% CI 1.62, 2.18)	-2.37 (-2.08, -2.66)	0.26 (0.43)	949 (62.6)	NR (0.17)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	4.90 (2.0)	2.09 (95% CI 1.91, 2.26)	-2.62 (-2.43, -2.80)	0.51 (0.10)	1,848 (65.2)	NR (0.17)
				Chronic MSK pain - Older adults (≥65 years old)		727	4.83 (2.0)	2.53 (95% CI 1.97, 3.08)	-2.11 (-1.53, -2.69)	reference	241 (62.3)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SE)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
Areias 2023b	ITT	NPRS	12 weeks	Chronic low back pain	Sword Health	560	4.76 (95% CI 4.6, 4.93)	2.44 (95% CI 2.17, 2.72)	-2.32 (-2.02, -2.61)	NR	NR	NR
Areias 2023c	ITT	NPRS	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	4.6 (2.0)	2.6 (95% CI 2.5, 2.8)	-2.0 (-2.1, -1.9)	NR (not significant)	NR (64.8)	NR
				Chronic MSK pain - SDI 20-40		2,903	4.7 (2.0)	2.6 (95% CI 2.5, 2.8)	-2.1 (-2.2, -1.9)	NR (not significant)	NR (66.6)	NR
				Chronic MSK pain - SDI 40-60		2,398	4.8 (2.0)	2.7 (95% CI 2.6, 2.9)	-2.1 (-2.2, -1.9)	NR (not significant)	NR (63.8)	NR
				Chronic MSK pain - SDI 60-80		1,874	4.9 (2.0)	2.8 (95% CI 2.6, 2.9)	-2.1 (-2.2, -1.9)	NR (not significant)	NR (59.9)	NR
				Chronic MSK pain - SDI 80-100		1,221	5.0 (2.0)	2.9 (95% CI 2.7, 3.1)	-2.1 (-2.3, -1.9)	reference	NR (63.4)	NR
Costa 2022a	ITT	NPRS	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	4.67 (1.98)	NR	NR	NR	NR	NR
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	5.10 (1.95)	NR	NR	NR	NR	NR
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	5.73 (1.97)	NR	NR	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SE)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
Janela 2023	ITT	NPRS	8-12 Weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	5.13 (95% CI 4.97, 5.29)	2.21 (95% CI 1.97, 2.45)	-2.92 (-3.2, -2.65)	NR	NR	NR
Scheer 2022	ITT	NPRS	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	4.9 (95% CI 4.8, 4.9)	2.9 (95% CI 2.8, 2.9)	-2.0 (-2.1, -1.9); p<0.001	NR	NR; p not significant	NR
				Chronic MSK pain - Asian		910	4.6 (95% CI 4.5, 4.8)	2.6 (95% CI 2.4, 2.8)	-2.0 (-2.25, -1.80); p<.001	NR (0.316)	NR; p not significant	NR (not significant)
				Chronic MSK pain - Black		1,025	5.6 (95% CI 5.4, 5.7)	3.2 (95% CI 3.0, 3.5)	-2.4 (-2.61, -2.10); p<.001	NR (0.001)	NR; p not significant	NR (not significant)
				Chronic MSK pain - Hispanic		913	5.3 (95% CI 5.1, 5.4)	2.7 (95% CI 2.5, 3.0)	-2.6 (-2.81, -2.30); p<.001	NR (<0.001)	NR; p not significant	OR 1.74 (0.001)
				Chronic MSK pain - Non-Hispanic White		6,240	4.8 (95% CI 4.7, 4.8)	2.8 (95% CI 2.8, 2.9)	-2.0[1]; p<.001	reference	NR; p not significant	reference
				Chronic MSK pain - Other		462	4.8 (95% CI 4.6, 5.0)	2.9 (95% CI 2.6, 3.2)	-1.9 (-2.21, -1.56); p<.001	NR (0.896)	NR; p not significant	NR (not significant)
Scheer 2023b	ITT	NPRS	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	5.1 (1.9)	NR	-2.42 (-2.50, -2.33)	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SE)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
Costa 2022b	ITT	NPRS	12 weeks	Acute low back pain	Sword Health	406	4.50 (95% CI 4.29, 4.70)	1.75 (95% CI 1.42, 2.09)	-2.74 (-3.11, -2.38)	NR	NR	NR
Costa 2022c	C	NPRS	12 weeks	Acute MSK pain	Sword Health	343	4.48 (1.41)	2.88 (95% CI -0.25, 3.96)	-1.6; p<0.001 [1]	NR	187 (74.8)	NR
Janela 2022a	ITT	NPRS	12 weeks	Chronic shoulder pain	Sword Health	296	4.56 (95% CI 4.35, 4.77)	2.06 (95% CI 1.81, 2.32)	-2.50 (-2.77, -2.22); p<0.001	NR	NR	NR
Janela 2022b	ITT	NPRS	12 weeks	Chronic Hip Pain	Sword Health	534	4.82 (95% CI 4.65, 4.98)	2.60 (95% CI 2.33, 2.87)	-2.22 (95% CI -1.93, -2.50)	NR	NR	NR
Scheer 2023a	ITT	NPRS	4-12 weeks	Acute & chronic MSK pain - Overall	Sword Health	9,992	4.83 (1.99)	NR	NR	NR	NR	NR
				Acute & chronic MSK pain - Urban		8,809	4.83 (1.99)	NR	-2.2 (-2.3, -2.2)	-0.1 (0.62)	NR (67.1)	NR
				Acute & chronic MSK pain - Rural		1,183	4.85 (1.98)	NR	-2.3 (-2.5, -2.1)	reference	NR (68.3); p=0.30	NR
VORI HEALTH												
Woznica 2023	ITT	NPRS	81 days	Acute & chronic low back pain	Vori Health	36	5.6 (1.8)	2.1 (1.9)	-3.5[1]; p<0.0001	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SE)	Between Group Difference Mean (P-value)	Achieving MCID n (%)	Between Group Difference OR (P-value)
OTHER												
Delgado 2023	ITT	NPRS	12 weeks	Chronic MSK pain	Simple Therapy	3,109	median: 4.47 (IQR 2.50)[2]	NR	-2.09[3]	NR	NR	NR

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, MCID – minimally clinically important difference, NPRS – numeric pain rating scale, NR – not reported, OR – odds ratio, SD – standard deviation, SDI – social deprivation index. 1. Calculated. 2. Max pain level. 3. Estimated reduction in NPRS by 11 sessions.

Appendix D-3: Other Pain Scales in Prospective Clinical Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Mecklenburg 2018	ITT	KOOS-Pain	12 weeks	Chronic knee pain	Hinge Health	101	41.0 (14.1)	30.3 (17.1)	-10.7 (NR) [1]	-7.7 (0.002)
					Control	54	41.4 (16.5)	38.4 (17.2)	-3 (NR) [1]	reference
	ITT	VAS	12 weeks	Chronic knee pain	Hinge Health	101	45.2 (21.4)	26.6 (22)	-18.6 (NR) [1]	-12.3 (0.001)
					Control	54	44.7 (20.3)	38.3 (22.2)	-6.4 (NR) [1]	reference
Shebib 2019	ITT	VAS	12 weeks	Chronic low back pain	Hinge Health	113	46.3 (20.9)	25.8 (21.4)	-20.5 (NR) [1]	-16 (<0.001)
					Control	64	45.4 (20.8)	40.8 (23.2)	-4.6 (NR) [1]	reference
	C	VAS - MCID	12 weeks	Chronic low back pain	Hinge Health	113	NR	56 (81%)	NR	53% (<0.001)[1]
					Control	64	NR	10 (28%)	NR	reference
	ITT	Modified von Korff-pain	12 weeks	Chronic low back pain	Hinge Health	113	51.1 (17.8)	33.8 (21.6)	-17.3 (NR) [1]	-16.4 (<0.001)
					Control	64	51.4 (17.4)	50.5 (21.4)	-0.9 (NR) [1]	reference
LIMBER HEALTH										
Gruner 2021	C	PROMIS-PI	8 weeks	Acute & chronic knee pain	Limber Health	24	58.8 (6.7)	52.7 (6.8)	-6.1 (SD 6.7); p<0.001	-4.6 (<0.05)[1]
					Control	26	57.0 (5.3)	55.5 (7.5)	-1.5 (SD 6.6); p not significant	reference
		PROMIS-PI, MCID	8 weeks	Acute & chronic knee pain	Limber Health	24	NR	NR (66.7%)	NR	20.5% (NR)[1]
					Control	26	NR	NR (46.2%)	NR	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
OTHER										
Bates 2023[3]	C	PROMIS-PI	8 weeks	Control	Control	9	52 (5)	48 (7)	NR; p=0.62	NR
				Training	Tonal Systems, Inc.	13	56 (4)	51 (7)	NR; p≤0.03	NR
				Clinical	Control	27	56 (7)	51 (8)	NR; p≤0.03	NR
				Combined Treatment	Tonal Systems, Inc.	20	59 (6)	55 (7)	NR; p≤0.03	NR

Key: CI – confidence interval, DHT – digital health technology, ITT – Intention-to-treat, C - Completers, MCID – minimally clinically important difference, NR – not reported, OR – odds ratio, PI – pain interference, PROMIS – Patient-Reported Outcomes Measurement Information System, SD – standard deviation, VAS – visual analog scale

1. Calculated. 2. Pain duration not specified. 3. Control arm: no treatment; Training arm: supervised artificial-intelligence-guided core-focused resistance training; Clinical arm: clinical care; Combined Treatment: both clinical care and artificial-intelligence-guided training.

Appendix D-4: Other Pain Scales in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Hong 2022	ITT	VAS	12 weeks	Acute MSK pain	Hinge Health	75	41.5 (21.8)	NR	NR	NR
					Control	98	44.7 (23.8)	NR	NR	NR
		VAS – MCID [4]	12 weeks	Acute MSK pain	Hinge Health	75	NR	29 (38.9)	NR	Adjusted OR 4.43 (NR)
					Control	96	NR	12 (12.5)	NR	reference
Wang 2022a	ITT	VAS	12 weeks	Acute MSK pain	Hinge Health	262	43.2 (21.7)	12.7 (14.2)	-30.5 (NR)	-12.3 (NR)[3]
					Control	675	42.9 (22.5)	24.7 (20.5)	-18.2 (NR)	reference
		PGIC	12 weeks	Acute MSK pain	Hinge Health	262	NR	95 (78.5%)	NR	35.5% (NR)
					Control	675	NR	53 (43.1%)	NR	reference
Wang 2022b	ITT	VAS	1 year	Chronic MSK pain	Hinge Health	2,720	45.0 (22.0)	22.1 (23.3)	-22.9 (NR)[1]	-6.9 (NR)[1]
					Control	1,650	48.7 (22.7)	32.7 (28.9)	-16.0 (NR)[1]	reference
		VAS - MCID	1 year	Chronic MSK pain	Hinge Health	2,720	NR	NR (72.2)	NR	16.0% (≤0.001)
					Control	1,650	NR	NR (56.2)	NR	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
Bailey 2020	ITT	VAS	12 weeks	Chronic MSK	Hinge Health	10,264	45.13 (22.42)	14.24 (15.31)	-30.98 (NR)	NR
				Back pain cohort		6,468	45.81 (22.16)	14.23 (15.12)	NR	NR
				Knee pain cohort		3,796	43.98 (22.81)	14.33 (15.59)	NR	NR
		VAS - MCID	12 weeks	Chronic MSK	Hinge Health	10,264	NR	7144 (69.60%)	NR	NR
		Modified von Korff-pain	12 weeks	Back pain cohort	Hinge Health	6,468	15.95 (5.03)	7.75 (5.44)	-8.20 (NR); p<0.001	NR
		KOOS-Pain	12 weeks	Knee pain cohort	Hinge Health	3,796	15.23 (6.66)	10.04 (5.81)	-5.19 (NR); p<0.001	NR
Wang 2021	ITT	VAS	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	46.54 (21.85)	NR	-27.13 (23.39)	reference
				Chronic MSK pain - Gen X		16,982	48.15 (22.44)	NR	-28.21 (23.60)	Adjusted OR -0.85 (not significant)
				Chronic MSK pain - Working age baby boomer		9,262	47.83 (22.72)	NR	-27.28 (23.39)	Adjusted OR -0.39 (not significant)
				Chronic MSK pain - Retiree age baby boomer and		1,462	46.28 (22.91)	NR	-25.60 (23.09)	Adjusted OR 0.46 (not significant)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
				silent generation						
Smittenaar 2017	ITT	KOOS-Pain	12 weeks	Chronic knee pain	Hinge Health	41	44.7 (SE 4.9) [1]	28.3 (SE 5.0)	-16 (95% CI -21, -12); p<0.001	NR
			6 months			41	44.7 (SE 4.9) [1]	26.3 (SE 5.0)	-18 (95% CI -23, -14); p<0.001	NR
	ITT	VAS	12 weeks	Chronic knee pain	Hinge Health	41	52	22	-30 (95% CI -38, -21); p<0.001	NR
			6 months			41	52	NR	-31 (95% CI -40, -23); p<0.001	NR
OMADA HEALTH										
Beresford 2022a	C	VAS	NR	Acute & chronic MSK pain	Omada Health	814	4.40 (2.18)	1.71 (1.85)	-2.69 (95% CI -2.86, -2.53); p<0.001	NR
		VAS – MCID*				814	NR	544 (66.8)	NR	NR
SWORD HEALTH										
Janela 2022b	ITT	HOOS-Pain	12 weeks	Chronic Hip Pain	Sword Health	515	65.59 (95% CI 64.33, 66.84)	78.91 (95% CI 77.17, 80.65)	13.32 (95% CI 11.67, 14.97)	NR
OTHER										
	ITT	PROMIS-PI	26 weeks		Telehealth	31	63.3 (4.9)	57.1 (9.5)	- 6.2 (NR) [1]	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
Skolasky 2022		Pain Self-Efficacy Questionnaire		Chronic low back pain		31	34.0 (12.4)	37.4 (16.4)	3.4 (NR) [1]	NR
Fritz 2022	ITT	PROMIS (r) Pain Intensity	10 weeks	Chronic low back pain	Telehealth	88 [2]	6.18 (1.47)	5.04 (2.18)	-1.17 (95% CI -1.60, -0.74)	NR
		PROMIS-PI				88 [2]	63.34 (4.60)	60.25 (7.63)	-2.99 (95% CI -4.70, -1.28)	NR
		Pain Self-Efficacy Questionnaire				88 [2]	32.67 (11.36)	34.95 (13.81)	-1.53 (95% CI -3.85, 0.78)	NR

Key: MCID – minimally clinically important difference, NR – not reported, PI – pain interference, PGIC – patient global impression of change, PROMIS – Patient-Reported Outcomes Measurement Information System, SD – standard deviation, SDI – social deprivation index, VAS – visual analog scale. 1. Digitized. 2. Number of patients that initiated telehealth PT. 3. Calculated. 4. In addition to MCID in pain, patients also had no more than mild pain, MCID in functional improvement, and no indication of depression or anxiety. *MCID data shown is from Beresford 2022b

Appendix E – Function Outcomes in SLR

Appendix E-1: Function and Disability in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Mecklenburg 2018	ITT	KOOS-PS	12 weeks	Chronic knee pain	Hinge Health	101	53.8 (12.3)	44.6 (16.7)	-9.2 (NR)[1]	-7.2 (0.001)
					Control	54	54.5 (15.7)	52.5 (16.2)	-2.0 (NR)[1]	reference
Shebib 2019	ITT	ODI	12 weeks	Chronic low back pain	Hinge Health	113	21.7 (12.1)	17.6 (12)	-4.1 (NR)[1]	-4.1 (<0.001)
					Control	64	21 (9.66)	21.1 (11.2)	0.1 (NR)[1]	reference
	C	ODI - MCID	12 weeks	Chronic low back pain	Hinge Health	113	NR	38 (55%)	NR	30% (0.006)[1]
					Control	64	NR	9 (25%)	NR	reference
	ITT	Modified von Korff-disability	12 weeks	Chronic low back pain	DHT	113	34.3 (23.1)	21.5 (19.6)	NR	-13 (<0.001)
					Control	64	40.3 (24)	40.5 (25.7)	NR	reference
KAIA HEALTH										
Priebe 2020[2]	C	HFAQ	3 months	Acute low back pain	Kaia Health	680	0.724 (0.186)	0.802 (0.181)	0.078 (NR)[1]	0.076 (0.05)[1]
					Control	261	0.781 (0.176)	0.783 (0.178)	0.002 (NR)[1]	reference
Toelle 2019[3]	C	HFAQ	12 weeks	Acute & chronic low back pain	Kaia Health	42	0.79 (0.14)	0.80 (0.12)	0.1 (NR)[1]	0.02 (>0.05)[1]

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
LIMBER HEALTH										
Gruner 2021	C	PROMIS-PF	8 weeks	Acute & chronic knee pain	Limber Health	24	44.7 (6.6)	50.7 (7.5)	6.0 (SD 6.6); p<0.001	-5.2 (<0.01)[1]
					Control	26	46.1 (5.5)	46.5 (8.5)	0.8 (SD 5.8); p not significant	reference
		PROMIS-PF, MCID	8 weeks	Acute & chronic knee pain	Limber Health	24	NR	NR (66.7%)	NR	32.1% (NR)
					Control	26	NR	NR (34.6%)	NR	reference
					Control	44	0.76 (0.15)	0.75 (0.23)	-0.01 (NR) [1]	reference
RECOVERYONE										
Bray 2021	ITT	ODI	4 weeks	Low back pain	Recovery One	10	NR	NR	4.4; p=0.017	NR
SWORD HEALTH										
Cui 2023	ITT	ODI	8 weeks	Chronic low back pain	Sword Health	70	median 24.84 (95% CI 19.93, 28.75)	median 17.94 (95% CI 6.37, 19.72)	median -6.90 (-19.33, -1.57); p<0.001	-0.55 (p=0.412)
					Control	70	median 25.34 (95% CI 21.91, 28.77)	median 18.99 (95% CI 15.20, 22.78)	median -6.35 (-10.36, -3.83); p<0.001	reference
	C	ODI - MCID	8 weeks	Chronic low back pain	Sword Health	70	NR	23 (40.4%)	NR	OR 0.926 (0.849)
					Control	70	NR	19 (42.2%)	NR	reference
Pak 2023	ITT	QuickDASH	8 weeks	Chronic shoulder pain	Sword Health	41	median 25 (IQR 20.5)	median 15.5 (95%	median -10.4	-1.8 (0.75)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
								CI 7.7, 23.2)	(-17, -3.7); p=0.002	
					Control	41	median 25 (IQR 17.1)	median 13.1 (95% CI 5.8, 20.3)	median -11.8 (-19.1, -4.6); p=0.002	reference
		Function - MCID	8 weeks	Chronic shoulder pain	Sword Health	41	NR	24 (61.5%)	NR	OR 0.84 (0.71)
					Control	41	NR	23 (65.7%)	NR	reference
OTHER										
Bates 2023[4]	C	PROMIS-PF	8 weeks	Low back pain - Control	Control	9	48 (3)	51 (6)	3; p≤0.05 [1]	reference
				Low back pain - Training	Tonal Systems, Inc.	13	44 (5)	49 (6)	5; p≤0.05 [1]	2 (NR)
				Low back pain - Clinical	Control	27	45 (5)	47 (6)	2; p=0.12 [1]	1 (NR)
				Low back pain – Combined Treatment	Tonal Systems, Inc.	20	42 (5)	44 (7)	2; p≤0.05 [1]	1 (NR)
		Biering-Sorenson's Exam	8 weeks	Low back pain - Control	Control	9	147 (55)	155 (55)	8; p≥0.17 [1]	NR
				Low back pain - Training	Tonal Systems, Inc.	13	79 (37)	105 (59)	26; p≥0.17[1]	NR
				Low back pain - Clinical	Control	27	126 (46)	137 (35)	11; p≤0.05 [1]	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				Low back pain – Combined Treatment	Tonal Systems, Inc.	20	107 (62)	139 (55)	32; p≤0.05 [1]	NR
		6-Minute Walk Test	8 weeks	Low back pain - Control	Control	9	0.28 (0.04)	0.30 (0.07)	0.02; p≥0.39 [1]	NR
				Low back pain - Training	Tonal Systems, Inc.	13	0.29 (0.08)	0.31 (0.06)	0.02; p≥0.39 [1]	NR
				Low back pain - Clinical	Control	27	0.29 (0.06)	0.30 (0.05)	0.01; p≤0.05 [1]	NR
				Low back pain – Combined Treatment	Tonal Systems, Inc.	20	0.27 (0.08)	0.29 (0.08)	0.02; ≤0.10[1]	NR

Key: DHT – digital health technology, HFAQ – Hanover Functional Ability Questionnaire, ITT – Intention-to-treat, C - Completers, KOOS-PS – The Knee disability and Osteoarthritis Outcome Score (KOOS) – Physical Function Shortform; MCID – minimally clinically important difference, NR – not reported, ODI – Oswestry Disability Index, OR – odds ratio, PF – physical function, PROMIS – Patient-Reported Outcomes Measurement Information System. [1] Calculated. [2] This citation reported HFAQ outcomes as percentages, which were converted to 0-1 scale for ease of comparison to data presented in other citations. [3] This citation reported HFAQ outcomes from the 0-1 range scale. 4. Control arm: no treatment; Training arm: supervised artificial-intelligence-guided core-focused resistance training; Clinical arm: clinical care; Combined Treatment: both clinical care and artificial-intelligence-guided training.

Appendix E-2: Function and Disability in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Hong 2022	ITT	Various – MCID [2]	12 weeks	Acute MSK pain	Hinge Health	75	NR	29 (38.9%)	NR	Adjusted OR 4.43 (NR)
					Control	96	NR	12 (12.5%)	NR	reference
Wang 2022a	ITT	Various - MCID	12 weeks	Acute MSK pain	Hinge Health	262	NR	94 (77.7%)	NR	26.9% (NR)
					Control	675	NR	62 (50.8%)	NR	reference
Wang 2022b	ITT	Various - MCID	1 year	Chronic MSK pain	Hinge Health	2,720	NR	NR (53.8%)	NR	reference
					Control	1,650	NR	NR (51.6%)	NR	2.2% (n.s.)
Smittenaar 2017	ITT	KOOS-PS	12 weeks	Chronic knee pain	Hinge Health	41	40.9 (SE 4.3) [1]	30.8 (SE 3.6)	-10 (-14, -6); p<0.001	NR
			6 months			41	40.9 (SE 4.3) [1]	27.3 (SE 3.6)	-14 (-18, -9); p<0.001	NR
OMADA										
Beresford 2022a	C	PSFS	NR	Acute & chronic MSK pain	Omada Health	814	5.15 (2.97)	7.82 (2.36)	2.67 (2.45, 2.89); p<0.001	NR
		PSFS – MCID*				814	NR	519 (63.8)	NR	NR
SWORD HEALTH										
Areias 2022	ITT	Various - MCID	1 year	Chronic MSK pain	Sword Health	427	NR	NR	NR	Adjusted OR 2.25 (<0.001)
					Control	440	NR	NR	NR	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
	C	Various - MCID	1 year	Chronic MSK pain	Sword Health	310	NR	NR (47.4%)	NR	Adjusted OR 2.02 (0.001)
					Control	150	NR	NR (36.9%)	NR	reference
Costa 2022b	ITT	ODI	12 weeks	Acute low back pain	Sword Health	406	14.93 (95% CI 13.95, 15.91)	6.71 (95% CI 5.45, 7.97)	-8.22 (-9.51, -6.93); p<0.001	NR
Janela 2023	ITT	QuickDASH	8-12 Weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	31.53 (95% CI 30.18, 32.89)	14.38 (95% CI 12.73, 16.02)	-17.15 (-18.87, -15.44,); p≤0.05	NR
Janela 2022a	ITT	QuickDASH	12 weeks	Chronic shoulder pain	Sword Health	296	26.07 (95% CI 24.59, 27.55)	12.62 (95% CI 11.08, 14.15)	-13.45 (-14.92, -11.99); p<0.001	NR
Janela 2022b	ITT	HOOS-Function	12 weeks	Chronic Hip Pain	Sword Health	251	75.08 (95% CI 73.17, 77.00)	86.09 (95% CI 83.89, 88.30)	11.01 (95% CI 8.61, 13.41)	NR
OTHER										
Skolasky 2022	ITT	ODI	26 weeks	Chronic low back pain	Tele-health	31	39.2 (13.6)	31.5 (17.7)	-7.7 (NR)	NR
		PROMIS-PF				31	38.8 (5.1)	41.7 (8.9)	NR	NR
Fritz 2022	C	ODI - MCID	10 weeks	Chronic low back pain	Tele-health	79	NR	39 (49.4%)	NR	NR
	ITT	ODI				88 [2]	40.21 (11.96)	33.75 (16.44)	-5.85 (-8.68, -3.02,)	NR
		PROMIS-PF				88 [2]	38.98 (5.32)	40.79 (7.24)	1.72 (0.13, 3.30)	NR
Werneke 2022	C	LCAT	NR	No TR	Control	1,333	50.3	65.6	15.3 [1]	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD) or n (%)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				All TR	TR	1,333	50.9	67.6	16.7 [1]	1.4 (NR)
				Acute & chronic low back pain - No TR	Control	86,104	NR	NR	NR	reference
				Acute & chronic low back pain - Any TR (synchronous)	TR	2,697	NR	NR	NR	0.0 (0.942)
				Acute & chronic low back pain – Any TR (asynchronous)		983	NR	NR	NR	-2.6 (0.006)
				Any TR (mixed)		1,333	NR	NR	NR	1.1 (0.317)

Key: DHT – digital health technology, HFAQ – Hanover Functional Ability Questionnaire, KOOS-PS – The Knee disability and Osteoarthritis Outcome Score (KOOS) – Physical Function Shortform; MCID – minimally clinically important difference, NR – not reported, ODI – Oswestry Disability Index, OR – odds ratio, PF – physical function, PROMIS – Patient-Reported Outcomes Measurement Information System, TR – telerehabilitation. 1. Calculated. 2. In addition to MCID in functional improvement, patients also had no more than mild pain, MCID in pain, and no indication of depression or anxiety. *MCID data shown is from Beresford 2022b

Results Key:

Statistical significance met

MCID threshold met

Statistical significance + MCID threshold met

Appendix F – Key Comparator Studies with Pain Outcomes

Company	Citation (I/O)	Com-parator	Analysis	Risk of Bias	Follow-up	Patient Population (N)	Scale[a]	n	Group	BASELINE Mean (SD) or Median (95% CI)	FOLLOW-UP Mean (SD) or Median (95% CI)	CHANGE FROM BASELINE[b] Mean (SD) or Median (95% CI)	% (p-value)	Proportion of Patients Achieving MCID	Mean (SD) or Median (95% CI) or IQR; p-value
IN-PERSON COMPARATOR GROUPS															
Kaia	Toelle 2019 (I)	In-person	C	H	12 weeks	Acute & chronic low back pain (N=86)	NPRS	42	DHT	5.10 (1.07)	2.70 (1.51)	**-2.4 (NR)****	**47.1%**[**1]	NR	-0.39[1]
								44	In-person PT	5.41 (1.15)	3.40 (1.63)	**-2.01 (NR)****	**37.2%**[**1]	NR	
Limber Health	Gruner 2021 (I)	In-person	C	M	8 weeks	Acute & chronic knee pain (N=50)	PROMIS-PI	24	DHT	58.8 (6.7)	52.7 (6.8)	**-6.1 (6.7)*****	**10.4%***[**1]	66.7%	**-4.6***[1]
								26	In-person PT	57.0 (5.3)	55.5 (7.5)	-1.5 (6.6)	2.6%[1]	46.2%	
Sword	Cui 2023 (I)	In-person	ITT	M	8 weeks	Chronic low back pain (N=140)	NPRS	70	DHT	5.40 (4.59, 6.02)	3.59 (0.86, 2.71)	**-1.81 (-3.51, -0.25)*****	**33.5%***[**1]	NR	Median 0.30
								70	In-person PT + Education	5.49 (5.05, 5.94)	3.38 (2.71, 4.05)	**-2.11 (-2.82, -1.49)*****	**38.4%***[**1]	NR	
Sword	Pak 2023 (I)	In-person	ITT	M	8 weeks	Chronic shoulder pain (N=82)	NPRS	41	DHT	4 (IQR:3)	2.1 (1.9, 2.3)	**-2 (-2.2, -1.8)*****	**50.0%***[**1,2]	NR	**Median 0.9***[**2]
								41	In-person PT + Education + TAU	5 (IQR:3)	1.5 (1.4, 1.7)	**-2.9 (-3.2, -2.6)*****	**58.0%***[**1,2]	NR	
OTHER COMPARATOR GROUPS															
Hinge	Mecklenburg 2018 (I)	Edu/TAU	ITT	H	12 weeks	Chronic knee pain (N=155)	VAS	101	DHT + TAU	45.2 (21.4)	26.6 (22)	-18.6 (NR)[1]	**41.2% (NR)**[**1]	NR	**-12.3*****
								54	Education + TAU	44.7 (20.3)	38.3 (22.2)	-6.4 (NR)[1]	14.3% (NR)[1]	NR	
Hinge	Shebib 2019 (I)	Edu/TAU	ITT	H	12 weeks	Chronic low back pain (N=177)	VAS	113	DHT + TAU	46.3 (20.9)	25.8 (21.4)	-20.5 (NR)[1]	**44.3% (NR)**[**1]	NR	**-16*****
								64	Education + TAU	45.4 (20.8)	40.8 (23.2)	-4.6 (NR)[1]	10.1% (NR)[1]	NR	

Company	Citation (I/O)	Com-parator	Analysis	Risk of Bias	Follow-up	Patient Population (N)	Scale[a]	n	Group	BASELINE Mean (SD) or Median (95% CI)	FOLLOW-UP Mean (SD) or Median (95% CI)	CHANGE FROM BASELINE[b] Mean (SD) or Median (95% CI)	% (p-value)	Proportion of Patients Achieving MCID	Mean (SD) or Median (95% CI) or IQR; p-value
Hinge	Hong 2022 (O)	Non-participant	ITT	M	12 weeks	Acute MSK pain (N=171)	VAS	75	DHT	41.5 (21.8)	NR	NR	NR	**38.9%[2]**	NR
								96	Non-participants	44.7 (23.8)	NR	NR	NR	**12.5%[2]**	
Hinge	Wang 2022a (O)	Non-participant	ITT	H	12 weeks	Acute MSK pain (N=937)	VAS	262	DHT	43.2 (21.7)	12.7 (14.2)	-30.5 (NR)	**70.6% (NR)[1]**	NR	-12.3 (NR)[1]
								675	Non-participants	42.9 (22.5)	24.7 (20.5)	-18.2 (NR)	**42.4% (NR)[1]**	NR	
Hinge	Wang 2022b (O)	Non-participant	ITT	H	1 year	Chronic MSK pain (N=4,370)	VAS	2,720	DHT	45.0 (22.0)	22.1 (23.3)	-22.9 (NR)[1]	**50.9% (NR)[1]**	72.2%	-6.9 (NR)[1]
								1,650	Non-participants	48.7 (22.7)	32.7 (28.9)	-16.0 (NR)[1]	**32.9% (NR)[1]**	56.2%	
Kaia	Priebe 2020 (I)	SOC	C	H	12 weeks	Acute low back pain (N=941)	NPRS	680	DHT + SOC	5.22 (1.71)	3.37 (2.35)	**1.85 (NR)***[1]**	**33.3%*** **	NR	**19%***[1]**
								261	SOC	5.21 (1.74)	4.02 (2.19)	**1.19 (NR)***[1]**	**14.3%*** **	NR	
Sword	Areias 2022 (O)	Non-participant	ITT	M	1 year	Chronic MSK pain (N=867)	NPRS	427	DHT	4.62 (SE 0.14)	2.19 (NR)[1]	**-2.43 (0.16)****	**52.6%**[1]**	NR	-0.65 (NR)[1]
								440	Non-participants	4.84 (SE 0.10)	3.06 (NR)[1]	**-1.78 (0.11)*****	**36.8%***[1]**	NR	

Color Key: Yellow cells indicate statistical significance achieved. Blue cells indicate patients in specified group, on average, achieved the scale specific cut off for MCID, or that the between-group difference for change from baseline met the scale specific cut off for MCID). Green cells indicate both statistical significance and MCID achieved.
Notes. Study Type: I = Interventional Study; O = Observational Study. Analysis: ITT = Intent to Treat; C = Completers. Risk of Bias: H = High; M = Medium. DHT = Digital Health Technology. PT = physical therapy. MSK = musculoskeletal. SOC = Standard of care (as defined by the national guideline for the treatment of unspecified back pain). TAU = Treatment as Usual. MCID = minimum clinically important difference. SD = standard deviation. SE = standard error. CI = confidence interval. AOR = Adjusted Odds Ratio. IQR = Interquartile Range. NR = Not Reported. NPRS = Numeric Pain Rating Scale. PROMIS-PI = Patient-Reported Outcomes Measurement Information System – Pain Interference scale. VAS = Visual Analog Scale. *p<0.05. **p<0.01. ***p<0.001. n.s. = not significant.
[a]When citations reported multiple scales, the one most reported among the group of citations is shown for ease of interpretation.
[1]Calculated value based on other data points provided in citation.
[2]In addition to MCID in pain, patients also had no more than mild pain, MCID in functional improvement, and no indication of depression or anxiety.

Appendix G – Pain Scales: Descriptions & MCID Thresholds

Scale	Description	Scoring	Minimal Clinically Important Difference (MCID)	MCID Threshold References[a]
SCALES USED IN COMPARATOR STUDIES				
Visual Analog Scale **(VAS)**	The pain VAS is a unidimensional measure of pain intensity, used to record patients' pain progression, or compare pain severity between patients with similar conditions.	Using a ruler, the score is determined by measuring the distance (mm) on the 10-cm line between the "no pain" anchor and the patient's mark, providing a range of scores from 0–100. A higher score indicates greater pain intensity.	15 points or 30% change from baseline	Ostelo et al., 2008[22]
Numerical Pain Rating Scale **(NPRS)**	The NPRS is a segmented numeric version of the visual analog scale from 0 to 10 on which a respondent selects a whole number that best reflects the intensity of his/her pain.	Scores range from 0-10 points. Higher scores indicating greater pain intensity.	2 points or ≥30% change from baseline	Farrar et al., 2001[23]
PROMIS Pain Interference **(PROMIS-PI)**	The PROMIS(PI) Pain Interference instrument measures the self-reported consequences of pain on relevant aspects of a person's life and may include the extent to which pain hinders engagement with social, cognitive, emotional, physical, and recreational activities.	5-point numeric rating. Higher scores indicate worse pain.	2 points change from baseline	Amtmann et al., 2016[24]; Lee et al., 2017[25]
SCALES USED IN OTHER STUDIES				
PROMIS(r) Pain Intensity	The PROMIS(r) Pain Intensity instrument has 3 items that assess how much a person hurts.	The score is the sum of the values of the response to the 3 questions.	N/A	N/A
Knee Injury and Osteoarthritis Outcome Score **(KOOS)** pain	The KOOS questionnaire was developed in the 1990s as an instrument to assess patients' opinion about their knee and associated problems. The five patient-relevant subscales of KOOS are scored separately: Pain (9 items); Symptoms (7 items); ADL Function (17 items); Sport and Recreation Function (5 items); Quality of Life (4 items).	The score is a percentage score from 0 to 100, with 0 representing extreme problems and 100 representing no problems.	N/A	N/A
Modified Von Korff - pain **(MvK)**	A modified version of the original Chronic Pain Grade questionnaire (CPG), a seven-item instrument that classifies chronic pain patients into one of four hierarchical categories according to pain severity or interference: Grade I, low disability-	The MvK yields a pain and a disability metric, both are metrics have a score from 0 to 100. The higher the score the	N/A	N/A

Scale	Description	Scoring	Minimal Clinically Important Difference (MCID)	MCID Threshold References[a]
	low intensity; Grade II, low disability-high intensity; Grade III high disability-moderately limiting; and Grade IV, high disability-severely limiting.	more severe the disability or the back pain.		
The Hip Disability and Osteoarthritis Outcome Score **(HOOS)**	The hip disability and osteoarthritis outcome score (HOOS) is a questionnaire intended to assess patients' opinion about their hip and associated problems, and to evaluate their symptoms and functional limitations during a therapeutic process. The HOOS includes 40 items.	The interval score ranges from 0 to 100 where 0 represents total disability and 100 represents perfect health.	N/A	N/A
Patient Global Impression of Change **(PGIC)**	The PGIC is a self-report measure used to assess a patient's rating of overall improvement on a 7-point scale since the start of study participation.	The 7 response options include: 1 = very much improved, 2 = much improved, 3 = minimally improved, 4 = no change, 5 = minimally worse, 6 = much worse, and 7 = very much worse.	N/A	N/A
The Pain Self-Efficacy Questionnaire **(PSEQ)**	The PSEQ is a 10-item questionnaire developed to assess the confidence people with ongoing pain have in performing activities while in pain.	A raw score is presented with a range from 0 – 60, where high scores indicate greater levels of confidence in dealing with pain.	N/A	N/A

Note. N/A = Not Applicable; MCID thresholds were not used to evaluate studies without comparators. [a]References shown are those reported by study citations; if references are not reported, the independent investigators (see Appendix A) used these references to evaluate whether data met MCID thresholds.

Results Key:

Statistical significance met

MCID threshold met

Statistical significance + MCID threshold met

Appendix H – Key Comparator Studies with Function Outcomes

Company	Citation (I/O)	Com-parator	Analysis	Risk of Bias	Follow-up	Population (N)	Scale[a]	n	Group	BASELINE Mean (SD) or Median (95% CI)	FOLLOW-UP Mean (SD) or Median (95% CI)	CHANGE FROM BASELINE[b] Mean (SD) or Median (95% CI)	% (p-value)	Proportion of Patients Achieving MCID	Between Group Difference Mean, % or Median (p-value)
IN-PERSON COMPARATOR GROUPS															
Kaia	Toelle 2019 (I)	In-person	C	H	12 weeks	Acute & chronic low back pain (N=86)	HFAQ	42	DHT	0.79 (0.14)	0.80 (0.12)	0.01 (NR)[1]	1.27% (NR)[1]	NR	0.02[1]
								44	In-person PT	0.76 (0.15)	0.75 (0.23)	-0.01 (NR)[1]	1.32%(NR)[1]	NR	
Limber	Gruner 2021 (I)	In-person	C	M	8 weeks	Acute & chronic knee pain (N=50)	PROMIS-PF	24	DHT	44.7 (6.6)	50.7 (7.5)	**6.0 (6.6)*** **	**13.4%*** [1,2]**	66.7%	**-5.2** [1,2]**
								26	In-person PT	46.1 (5.5)	46.5 (8.5)	0.8 (5.8)	1.7%[1,2]	34.6%	
Sword	Cui 2023 (I)	In-person	ITT	M	8 weeks	Chronic low back pain (N=140)	ODI	70	DHT	24.84 (19.93, 28.75)	17.94 (6.37, 19.72)	**-6.90 (-19.33, -1.57)*** **	**27.8%*** [1]**	NR	-0.55
								70	In-person PT + Education	25.34 (21.91, 28.77)	18.99 (15.20, 22.78)	**-6.35 (-10.36, -3.83)*** **	**25.1%*** [1]**	NR	
Sword	Pak 2023 (I)	In-person	ITT	M	8 weeks	Chronic shoulder pain (N=82)	Quick-DASH	41	DHT	25 (IQR 20.5)	15.5 (7.7, 23.2)	**-10.4 (-17, -3.7)** **	**41.6%** [1,2]**	61.5%	-1.8[2]
								41	In-person PT + Education + TAU	25 (IQR 17.1)	13.1 (5.8, 20.3)	**-11.8 (-19.1, -4.6)** **	**47.2%** [1,2]**	65.7%	
NR	Werneke 2022 (O)	In-person	C	M	NR	Acute & Chronic low back pain (N=2,666)	LCAT	1,333	All TR	50.9 (NR)	67.6 (NR)	**16.7 (NR)[1]**	32.8% (NR)[1]	NR	1.4 (NR)[1]
								1,333	Control[3]	50.3 (NR)	65.6 (NR)	**15.3 (NR)[1]**	30.4% (NR)[1]	NR	

Company	Citation (I/O)	Com-parator	Analysis	Risk of Bias	Follow -up	Population (N)	Scale[a]	n	Group	BASELINE Mean (SD) or Median (95% CI)	FOLLOW-UP Mean (SD) or Median (95% CI)	CHANGE FROM BASELINE[b] Mean (SD) or Median (95% CI)	% (p-value)	Proportion of Patients Achieving MCID	Between Group Difference Mean, % or Median (p-value)
OTHER COMPARATOR GROUPS															
Hinge	Mecklenburg 2018 (I)	Edu/ TAU	ITT	H	12 weeks	Chronic knee pain (N=162)	KOOS-PS	101	DHT + TAU	53.8 (12.3)	44.6 (16.7)	-9.2 (NR)[1]	17.1% (NR)[1]	NR	**-7.2*** **
								54	Education + TAU	54.5 (15.7)	52.5 (16.2)	-2.0 (NR)[1]	3.7% (NR)[1]	NR	
Hinge	Shebib 2019 (I)	Edu/ TAU	ITT	H	12 weeks	Chronic low back pain (N=177)	ODI	113	DHT + TAU	21.7 (12.1)	17.6 (12)	-4.1 (NR)[1]	18.9% (NR)[1]	NR*	**-4.1*** **
								64	Education + TAU	21 (9.66)	21.1 (11.2)	0.1 (NR)[1]	0.5% (NR)[1]	NR	
Hinge	Hong 2022 (O)	Non-partici-pant	ITT	M	12 weeks	Acute MSK Pain (N=171)	Various[5]	75	DHT	NR	NR	NR	NR	38.9%[6]	NR
								96	Non-participants	NR	NR	NR	NR	12.5%[6]	
Hinge	Wang 2022a (O)	Non-partici-pant	ITT	H	12 weeks	Acute MSK pain (N=937)	Various[5]	262	DHT	NR	NR	NR	NR	77.7%	NR
								675	Non-participants	NR	NR	NR	NR	50.8%	
Hinge	Wang 2022b (O)	Non-partici-pant	ITT	H	1 year	Chronic MSK pain (N=4,370)	Various[5]	2,720	DHT	NR	NR	NR	NR	53.8%	NR
								1,650	Non-participants	NR	NR	NR	NR	51.6%	

Company	Citation (I/O)	Com-parator	Analysis	Risk of Bias	Follow -up	Population (N)	Scale[a]	n	Group	BASELINE Mean (SD) or Median (95% CI)	FOLLOW-UP Mean (SD) or Median (95% CI)	CHANGE FROM BASELINE[b] Mean (SD) or Median (95% CI)	% (p-value)	Proportion of Patients Achieving MCID	Between Group Difference Mean, % or Median (p-value)
Kaia	Priebe 2020 (I)	SOC	C	H	12 weeks	Acute low back pain (N=941)	HFAQ[7]	680	DHT + SOC	0.724 (0.186)	0.802 (0.181)	0.078 (NR)[1]	10.8% (NR)[1]	NR	**0.076*[1]**
								261	SOC	0.781 (0.176)	0.783 (0.178)	0.002 (NR)[1]	0.3% (NR)[1]	NR	
Sword	Areias 2022 (O)	Non-partici-pant	ITT	M	1 year	Chronic MSK pain (N=867)	Various[4]	427	DHT	NR	NR	NR	NR	NR	**AOR 2.25*** 95% CI: 1.72, 2.96**
								440	Non-participants	NR	NR	NR	NR	NR	

Color Key: Yellow cells indicate statistical significance achieved. Blue cells indicate patients in specified group, on average, achieved the scale specific cut off for MCID, or that the between-group difference for change from baseline met the scale specific cut off for MCID). Green cells indicate both statistical significance and MCID achieved.
Notes. Study Type: I = Interventional Study; O = Observational Study. Analysis: ITT = Intent to Treat; C = Completers. Risk of Bias: H = High; M = Medium. DHT = Digital Health Technology. PT = physical therapy. MSK = musculoskeletal. TR = Telerehabilitation. SOC = Standard of care (as defined by the national guideline for the treatment of unspecified back pain). TAU = Treatment as Usual. MCID = minimum clinically important difference. SD = standard deviation. CI = confidence interval. AOR = Adjusted Odds Ratio. IQR = Interquartile Range. NR = Not Reported. HFAQ = Hannover Functional Ability Questionnaire. PROMIS-PF = Patient-Reported Outcomes Measurement Information System – Physical Function scale. LCAT = Lumbar Computer Adaptive Test. ODI = Oswestry Low Back Disability Questionnaire. Quick-DASH = Quick Disabilities of the Arm, Shoulder and Hand. KOOS-PS = Knee Injury and Osteoarthritis Outcome Score Physical Function Shortform. *p<0.05. **p<0.01. ***p<0.001. n.s. = not significant.
[a]When citations reported multiple scales, the one most reported among the group of citations is shown for ease of interpretation.
[1]Calculated value based on other data points provided in citation.
[2]Based on adjusted change from baseline scores.
[3]Comparator group (i.e., No telerehabilitation) is the propensity-score matched control group for the DHT (i.e., All Telerehabilitation group).
[4]Includes multiple scales: QuickDASH; HOOS-PS; KOOS-PS; ODI; NDI; Quick-FAAM.
[5]Includes multiple scales: RMDQ-11 (back pain only), KOOS-PS (knee pain only), HOOS-PS (hip pain only), SPADI (shoulder pain only), sf-NPAD (neck pain only).
[6]In addition to MCID in functional improvement, patients also had no more than mild pain, MCID in pain, and no indication of depression or anxiety.
[7]This citation reported HFAQ outcomes as percentages, which were converted to 0-1 scale for ease of comparison to data presented in other citations.

Appendix I – Function Scales: Descriptions & MCID Thresholds

Scale	Description	Scoring	Minimal Clinically Important Difference (MCID)	MCID Threshold References[a]
SCALES USED IN COMPARATOR STUDIES				
The Oswestry Disability Index **(ODI)**	The Oswestry Disability Index (ODI) is a patient-completed questionnaire that gives a subjective percentage score of level of function (disability) in activities of daily living in patients rehabilitating from low back pain.	The total score is calculated as a percentage, with 0% indicating no disability and 100% indicating the highest level of disability.	10 points change from baseline	Hung et al, 2018[26]; Ostelo et al, 2008[27]
PROMIS Physical Function **(PROMIS-PF)**	The PROMIS Physical Function (PROMIS-PF) item bank is one of the PROMIS instruments which is highly relevant for physical therapists and their patients. Physical function refers to the ability to perform activities of daily living and instrumental activities of daily living.	The PROMIS-PF is scored on a 0 to 100 point scale, with a population mean of 50 and SD of 10.	2.4 points change from baseline	Lee et al., 2017[28]
Disabilities of the Arm, Shoulder and Hand **(QuickDASH)**	The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire is a 30-item questionnaire that looks at the ability of a patient to perform certain upper extremity activities. The QuickDASH is an abbreviated version of the original DASH outcome measure that only contains 11 items.	The QuickDASH uses a Scoring Formula ([(sum of n responses)/ number of completed items] -1)(25) where higher scores indicate a greater level of disability and severity, and lower scores indicate a lower level of disability.	33% change from baseline	Budtz et al., 2018[29]; Rysstad et al., 2020[30]
Hannover Functional Ability Questionnaire **(HFAQ)**	The HFAQ (German: Funktionsfragebogen Hannover für Rückenschmerzen; FFbH-R) is a questionnaire completed by patients about their back-specific functional disability.	The HFAQ score ranges from 0 (minimal function) to 100 (optimal function, no limitation); scores ≤70 points indicate a clinically significant functional limitation. Note: Scores can also be reported on a 0-1 range.	Not Available	Not Available

Scale	Description	Scoring	Minimal Clinically Important Difference (MCID)	MCID Threshold References[a]
Lumbar Computer Adaptive Test **(LCAT)**	The LCAT is a computerized adaptive test (CAT) designed to assess lumbar spine functional status (LFS) in patients with lumbar spine impairments.	LCAT scores fall on a linear metric from 0 to 100, with higher scores indicating better functional status.	An average of 5 points or more change from baseline	Wang et al., 2010[31]
KOOS-Physical Function Shortform **(KOOS-PS)**	The KOOS questionnaire was developed in the 1990s as an instrument to assess patients' self-reported knee functioning and associated problems. Based on the KOOS questionnaire, the KOOS-PS is a self-reported joint-specific measure for physical function which was developed to assess a large spectrum of patients with knee injuries and osteoarthritis.	KOOS-PS scores are a percentage score from 0 to 100, with 0 representing extreme problems and 100 representing no problems.	10 points change from baseline	Roos et al., 1998[32]
SCALES USED IN OTHER STUDIES				
Modified von Korff-disability **(MvK)**	The MvK is a modified version of the original Chronic Pain Grade questionnaire (CPG), a seven-item instrument that provides a score which classifies chronic pain patients into one of four hierarchical categories according to pain severity or interference: Grade I, low disability-low intensity; Grade II, low disability-high intensity; Grade III high disability-moderately limiting; and Grade IV, high disability-severely limiting.	The MvK yields a pain and a disability metric, both are metrics have a score from 0 to 100. The higher the score the more severe the disability or the back pain.	N/A	N/A
Biering-Sorenson's Exam	The Biering-Sorenson test was first described by Hansen in 1964 as an examination of the isometric endurance of the hip and back extensor muscles. The test, as described by Sorenson, is "measuring how many seconds the subject is able to keep the unsupported upper body (from the upper border of the iliac crest) horizontal, while placed prone with the buttocks and legs fixed to the couch by three wide canvas straps and the arms folded across the chest."	The score is the time (in seconds) that the patient can hold the position. The maximum amount of time is 240 seconds.	N/A	N/A
6-Minute Walk Test **(6MWT)**	The 6MWT assesses the distance walked over 6 minutes as a sub-maximal test of aerobic capacity/endurance.	The score is the patient's distance in meters.	N/A	N/A

Scale	Description	Scoring	Minimal Clinically Important Difference (MCID)	MCID Threshold References[a]
Patient Specific Functional Scale **(PSFS)**	The PSFS was developed as a self-report outcome measure of function that could be used in patients with varying levels of independence. Patients are asked to rate (on an 11-point scale) the current level of difficulty associated with each activity. "0" represents “unable to perform” and "10" represents “able to perform at prior level”.	The score is the sum of activity scores divided by the number of activities.	N/A	N/A
Hip disability and osteoarthritis outcome short form **(HOOS-Function)**	The HOOS is a questionnaire intended to assess patients’ self-reported hip function and associated problems, and to evaluate their symptoms and functional limitations during a therapeutic process. The HOOS includes 40 items, including five subcategories: Pain (10 items); Symptoms and stiffness (5 items); Activities of daily living (17 items); Function in sports and recreational activities (4 items); Quality of life (4 items).	The interval score ranges from 0 to 100 where 0 represents total disability and 100 represents perfect health.	N/A	N/A

Note. N/A = Not Applicable; MCID thresholds were not used to evaluate studies without comparators. [a]References shown are those reported by study citations; if references are not reported, the independent investigators (see Appendix A) used these references to evaluate whether data met MCID thresholds.

Results Key:

Statistical significance met

MCID threshold met

Statistical significance + MCID threshold met

Appendix J – Comparator Study Findings by DHT Categories

Appendix J-1: Pain Outcomes

				CHANGE FROM BASELINE[b] % (p-value) or Mean (SD) [Proportion of Patients Achieving MCID]	
Citation	**Comparator**	**Scale[a]**	**MCID Threshold**	**DHT Group**	**Comparator Group**
APP-BASED EXERCISE THERAPY SOLUTIONS					
Priebe 2020	SOC	NPRS	≥33%	**33.3%*** [NR]**	**14.3%*** [N/A]**
Toelle 2019	In-person PT	NPRS	30%	**47.1%**[1] [NR]**	**37.2%**[1] [NR]**
PHYSICAL THERAPIST-GUIDED SOLUTIONS					
Areias 2022	Non-participants	NPRS	30%	**52.6%**[1] [NR]**	**36.8%***[1] [NR]**
Cui 2023	In-person PT + Education + TAU	NPRS	2 points or 30%	**33.5%***[1] [NR]**	**38.4%***[1] [NR]**
Hong 2022	Non-participants	VAS	20 points or 30%	**NR (NR) [38.9%][3]**	**NR (NR) [12.5%][3]**
Mecklenburg 2018	Education + TAU	VAS	15 points or 30%	**41.2% (NR)[1] [NR]**	14.3% (NR)[1] [N/A]
Pak 2023	In-person PT + Education + TAU	NPRS	≥ 2 points or 30%	**50.0%***[1,2] [NR]**	**58.0%***[1,2] [NR]**
Shebib 2019	Education + TAU	VAS	15 points or ≥30%	**44.3% (NR)[1] [NR]**	10.1% (NR)[1] [N/A]
Wang 2022a	Non-participants	VAS	20 points or 30%	**70.6% (NR)[1] [NR]**	**42.4% (NR)[1] [NR]**
Wang 2022b	Non-participants	VAS	20 points or 30%	**50.9% (NR)[1] [72.2%]**	**32.9% (NR)[1] [56.2%]**
RTM-AUGMENTED PT SOLUTIONS					
Gruner 2021	In-person PT	PROMIS-PI	2.0 points	**-6.1 (6.7)*** [66.7%]**	1.5 (6.6) [46.2%]

Color Key: Yellow cells indicate statistical significance achieved. Blue cells indicate patients in specified group, on average, achieved the scale specific cut off for MCID. Green cells indicate both statistical significance and MCID achieved.
Notes. RTM = Remote therapeutic monitoring. PT = physical therapy. MSK = musculoskeletal. DHT = Digital Health Technology. SOC = Standard of care (as defined by the national guideline for the treatment of unspecified back pain). TAU = Treatment as Usual. NR = Not Reported. MCID = minimum clinically important difference. SD = standard deviation. NPRS = Numeric Pain Rating Scale. PROMIS-PI = Patient-Reported Outcomes Measurement Information System – Pain Interference scale. VAS = Visual Analog Scale.
*p<0.05. **p<0.01. ***p<0.001. n.s. = not significant.
[a]When citations reported multiple scales, the one most reported among the group of citations is shown for ease of interpretation.
[b]Values shown in table are for whichever change from baseline (mean/median scale points or percentage) achieved MCID threshold.
[1]Calculated value based on other data points provided in citation.
[2]Based on adjusted change from baseline scores.
[3]In addition to MCID in pain, patients also had no more than mild pain, MCID in functional improvement, and no indication of depression or anxiety.

Results Key:

Statistical significance met

MCID threshold met

Statistical significance + MCID threshold met

Appendix J-2: Function Outcomes

Citation	Comparator	Scale[a]	MCID Threshold	CHANGE FROM BASELINE[b] % (p-value) or Mean (SD) [Proportion of Patients Achieving MCID]	
				DHT Group	Comparator Group
APP-BASED EXERCISE THERAPY SOLUTIONS					
Priebe 2020	SOC	HFAQ	N/A	10.8% (NR)[1] [N/A]	0.26% (NR)[1] [N/A]
Toelle 2019	In-person PT	HFAQ	N/A	1.27% (NR)[1] [N/A]	1.32% (NR)[1] [N/A]
PHYSICAL THERAPIST-GUIDED SOLUTIONS					
Areias 2022	Non-participants	Various[4]	N/A	NR [NR]	NR [NR]
Cui 2023	In-person PT + Education + TAU	ODI	10 points or 30%	**-6.90 (-19.33, -1.57)*** [N/A]**	**-6.35 (-10.36, -3.83)*** [N/A]**
Hong 2022	Non-participants	Various[5]	N/A	NR [38.9%][8]	NR [12.5%[8]]
Mecklenburg 2018	Education + TAU	KOOS-PS	10 points	17.1% (NR)[1] [N/A]	3.7% (NR)[1] [N/A]
Pak 2023	In-person PT + Education + TAU	QuickDASH	33%	**41.6%**[1,2] [61.5%]**	**47.2%**[1,2] [65.7%]**
Shebib 2019	Education + TAU	ODI	≥10 score	18.9% (NR)[1] [N/A]	0.5% (NR)[1] [N/A]
Wang 2022a	Non-participants	Various[5]	N/A	NR [77.7%]	NR [50.8%]
Wang 2022b	Non-participants	Various[5]	N/A	NR [53.8%]	NR [51.6%]
Werneke 2022	In-person PT[3]	LCAT	An average of ≥5 points	**16.7 (NR)[1] [32.8%]**	**15.3 (NR)[1] [30.4%]**
RTM-AUGMENTED PT SOLUTIONS					
Gruner 2021	In-person PT	PROMIS-PF	2.4 points	**6.0 (6.6)*** [66.7%]**	0.8 (SD 5.8) [34.6%]

Color Key: Yellow cells indicate statistical significance achieved. Blue cells indicate patients in specified group, on average, achieved the scale specific cut off for MCID. Green cells indicate both statistical significance and MCID achieved.

Notes. RTM = Remote therapeutic monitoring. PT = physical therapy. MSK = musculoskeletal. I = Interventional Study. O = Observational Study. DHT = Digital Health Technology. SOC = Standard of care (as defined by the national guideline for the treatment of unspecified back pain). TAU = Treatment as Usual. NR = Not Reported. MCID = minimum clinically important difference. SD = standard deviation. HFAQ = Hannover Functional Ability Questionnaire. PROMIS-PF = Patient-Reported Outcomes Measurement Information System – Physical Function scale. LCAT = Lumbar Computer Adaptive Test. ODI = Oswestry Low Back Disability Questionnaire. Quick-DASH = Quick Disabilities of the Arm, Shoulder and Hand. KOOS-PS = Knee Injury and Osteoarthritis Outcome Score Physical Function Shortform.

*p<0.05. **p<0.01. ***p<0.001. n.s. = not significant.

[a]When citations reported multiple scales, the one most reported among the group of citations is shown for ease of interpretation.

[b]Values shown in table are for whichever change from baseline (mean/median scale points or percentage) achieved MCID threshold.

[1]Calculated value based on other data points provided in citation.

[2]Based on adjusted change from baseline scores.

[3]Comparator group (i.e., no telerehabilitation) is the propensity-score matched control group for the DHT (i.e., All telerehabilitation group).

[4]Participants achieved MCID on average across all scales: QuickDASH; HOOS-PS (Hip disability and osteoarthritis outcome short form); KOOS-PS; ODI; NDI (Neck Disability Index); Quick-FAAM (Quick Disabilities for Foot and Ankle Ability Measure).

[5]Participants achieved MCID on average across all scales: RMDQ-11 (11-item Roland Morris Disability Questionnaire; back pain only), KOOS-PS (knee pain only), HOOS-PS (hip pain only), SPADI (Shoulder Pain and Disability Index; shoulder pain only), sf-NPAD (Neck Pain and Disability Scale short form; neck pain only).

Appendix K – Secondary Outcomes

Appendix K-1: Work Productivity and Activity Impairment (WPAI) in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
SWORD HEALTH										
Cui 2023	ITT	WPAI-overall	8 weeks	Chronic low back pain	Sword Health	70	median 25.61 (13.81, 30.80)	median 16.87 (0.00, 18.98)	median -8.74 (-25.98, -2.72)	-0.80 (0.208)
					Control	70	median 23.79 (18.84, 28.74)	median 17.67 (10.29, 25.05)	median -6.12 (-9.25, 4.97)	reference
		WPAI-work	8 weeks	Chronic low back pain	Sword Health	70	median 23.52 (11.32, 29.49)	median 15.33 (0.00, 17.62)	median -8.19 (-22.87, 0.03)	-0.96 (0.137)
					Control	70	median 22.51 (17.62, 27.40)	median 16.29 (8.86, 23.73)	median -6.22 (-10.14, 2.68)	reference
		WPAI-time	8 weeks	Chronic low back pain	Sword Health	70	median 3.35 (0.00, 13.08)	median 0.00 (0.00, 13.08)	median -3.36 (-9.01, -1.51)	0.00 (0.338)
					Control	70	median 2.63 (0.29, 4.96)	median 0.00 (0.00, 2.34)	median -2.63 (-4.38, -1.99)	reference
		WPAI-activity	8 weeks	Chronic low back pain	Sword Health	70	median 35.59 (27.39, 44.10)	median 22.66 (1.11, 28.34)	median -12.93 (-32.09, -3.11)	0.80 (0.825)
					Control	70	median 36.73 (29.60, 43.87)	median 23.45 (17.22, 29.69)	median -13.28 (-19.27, -7.38)	reference

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, SD – standard deviation, WPAI – work productivity and activity impairment

Appendix K-2: Work Productivity and Activity Impairment (WPAI) in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
SWORD HEALTH										
Areias 2023a	ITT	WPAI-overall, Score >0	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	31.4 (SD 21.8)	13.71 (9.52, 17.90)	-16.01 (-20.15, -11.87)	8.89 (0.12)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	30.9 (SD 22)	10.73 (7.83, 13.62)	-18.29 (-21.32, -15.26)	11.17 (0.05)
				Chronic MSK pain - Older adults (≥65 years old)		727	29.7 (SD 23.5)	17.98 (7.15, 28.81)	-7.12 (-17.65, 0)	reference
		WPAI-work, Score >0	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	29 (SD 19.0)	12.12 (8.33, 15.90)	-14.7 (-18.54, -10.85)	4.93 (0.20)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	28.4 (SD 18.8)	8.59 (6.22, 10.96)	-17.82 (-20.34, -15.30)	8.06 (0.02)
				Chronic MSK pain - Older adults (≥65 years old)		727	25.7 (SD 17.6)	12.58 (5.89, 19.26)	-9.77 (-16.33, -3.21)	reference
		WPAI-time, Score >0	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	23.8 (SD 28.0)	9.50 (5.7, 13.28)	-14.13 (-18.20, -10.06)	-9.75 (0.08)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	26 (SD 30.5)	8.12 (5.24, 11.00)	-17.84 (-21.21, -14.45)	-6.04 (0.27)
				Chronic MSK pain - Older adults (≥65 years old)		727	40 (SD 40.6)	13.45 (2.93, 24.00)	-23.88 (- 34.12, -13.64)	reference
		WPAI-activity, Score >0	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	35 (SD 21.5)	11.25 (8.46, 14.04)	-20.69 (-23.73, -17.66)	7.08 (0.06)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	35.7 (SD 22.5)	12.27 (10.17, 14.37)	-19.34 (-21.57, -17.11)	572 (0.11)
				Chronic MSK pain - Older adults (≥65 years old)		727	35.2 (SD 22.3)	12.20 (6.46, 17.94)	-13.62 (-20.20, -7.03)	reference
Areias 2023b	ITT	WPAI-overall	12 weeks	Chronic low back pain	Sword Health	560	17.41 (15.45, 19.38)	7.41 (5.57, 9.26)	-10.00 (-12.46, -7.54)	NR
		WPAI-work				560	16.42 (14.55, 18.28)	6.94 (5.17, 8.7)	-9.48 (-11.81, -7.15)	NR
		WPAI-time				560	4.61 (2.93, 6.29)	2.81 (1.19, 4.43)	-1.80 (-3.34, -0.26)	NR
		WPAI-activity >0				560	36.73 (34.5, 38.96)	15.38 (11.61, 19.14)	-21.36 (-25.22, -17.49)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
Areias 2023c	ITT	WPAI-overall	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	15.16 (14.44, 15.88)	10.03 (8.96, 11.1)	-5.13 (-6.26, -3.99)	NR (0.007)
				Chronic MSK pain - SDI 20-40		2,903	18.7 (17.71, 19.68)	11.16 (9.68, 12.65)	-7.54 (-9.07, -6)	NR (0.002)
				Chronic MSK pain - SDI 40-60		2,398	18.84 (17.84, 19.83)	11.1 (9.67, 12.53)	-7.74 (-9.22, -6.25)	NR (0.027)
				Chronic MSK pain - SDI 60-80		1,874	19.6 (18.42, 20.77)	12.02 (10.42, 13.63)	-7.57 (-9.29, -5.85)	NR (0.030)
				Chronic MSK pain - SDI 80-100		1,221	21.59 (20.06, 23.11)	11.31 (9.26, 13.36)	-10.28 (-12.45, -8.12)	reference
		WPAI-work	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	13.87 (13.22, 14.52)	8.68 (7.73, 9.62)	-5.19 (-6.2, -4.19)	NR (not significant)
				Chronic MSK pain - SDI 20-40		2,903	16.8 (15.93, 17.67)	8.72 (7.52, 9.91)	-8.08 (-9.36, -6.81)	NR (0.043)
				Chronic MSK pain - SDI 40-60		2,398	16.9 (16.02, 17.77)	8.78 (7.64, 9.92)	-8.12 (-9.34, -6.9)	NR (not significant)
				Chronic MSK pain - SDI 60-80		1,874	17.34 (16.32, 18.37)	10.38 (8.98, 11.79)	-6.96 (-8.47, -5.45)	NR (not significant)
				Chronic MSK pain - SDI 80-100		1,221	18.73 (17.4, 20.05)	9.72 (8.01, 11.44)	-9.01 (-10.81, -7.2)	reference
		WPAI-time	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	1.89 (1.55, 2.24)	1.75 (1.17, 2.34)	-0.14 (-0.78, 0.5)	NR (not significant)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
				Chronic MSK pain - SDI 20-40		2,903	2.88 (2.31, 3.44)	2.97 (1.9, 4.05)	0.1 (-1.01, 1.2)	NR (not significant)
				Chronic MSK pain - SDI 40-60		2,398	2.84 (2.27, 3.41)	2.71 (1.73, 3.68)	-0.13 (-1.16, 0.89)	NR (not significant)
				Chronic MSK pain - SDI 60-80		1,874	3.34 (2.62, 4.06)	2.28 (1.4, 3.16)	-1.06 (-2.15, 0.03)	NR (not significant)
				Chronic MSK pain - SDI 80-100		1,221	4.55 (3.57, 5.52)	2.13 (0.88, 3.38)	-2.42 (-3.85, -0.98)	reference
		WPAI-activity	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	25.48 (24.72, 26.24)	14.47 (13.42, 15.52)	-11.01 (-12.11, -9.91)	NR (0.001)
				Chronic MSK pain - SDI 20-40		2,903	27.41 (26.44, 28.38)	14.39 (13.04, 15.73)	-13.02 (-14.46, -11.58)	NR (0.001)
				Chronic MSK pain - SDI 40-60		2,398	27.81 (26.83, 28.8)	14.32 (12.99, 15.64)	-13.5 (-14.93, -12.06)	NR (0.001)
				Chronic MSK pain - SDI 60-80		1,874	27.76 (26.61, 28.9)	15.07 (13.56, 16.59)	-12.69 (-14.32, -11.05)	NR (not significant)
				Chronic MSK pain - SDI 80-100		1,221	28.34 (26.87, 29.82)	13.98 (12.16, 15.81)	-14.36 (-16.31, -12.41)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
Costa 2022a	ITT	WPAI-overall	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	13.9 (13.11, 14.7)	NR	-6.84 (-8.82, -4.86); p<0.001	reference
		WPAI-work	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	13.04 (12.3, 13.79)	NR	-6.2 (-8, -4.39); p<0.001	reference
		WPAI-time	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	2.02 (1.58, 2.46)	NR	-0.98 (-2.09, -0.12); p=0.06	reference
		WPAI-activity	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	22.57 (21.74, 23.4)	NR	-10.08 (-11.95, -8.21); p<0.001	reference
		WPAI-overall	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	21.87 (19.39, 24.35)	NR	-11.33 (-16.6, -6.06); p<0.001	-3.48 (0.22)
		WPAI-work	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	20.78 (18.4, 23.16)	NR	-11.37 (-16.17, -6.57); p<0.001	-2.57 (0.31)
		WPAI-time	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	3.67 (2.01, 5.34)	NR	-1.42 (-3.93, 1.09); p=0.23	-1.21 (0.35)
		WPAI-activity	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	30.99 (28.74, 33.23)	NR	-13.14 (-18.22, -8.06); p<0.001	-5.35 (0.05)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
		WPAI-overall	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10	Sword Health	490	39.68 (34.86, 44.5)	NR	-12.34 (-23.65, -1.03); p=0.03	-20.28 (<0.001)
		WPAI-work	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	37.13 (32.59, 41.67)	NR	-13.54 (-24.42, -2.65); p=0.01	-16.75 (0.003)
		WPAI-time	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	13.45 (8.94, 17.97)	NR	-5.63 (-11.05, -0.21); p=0.03	-6.78 (0.02)
		WPAI-activity	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	46.35 (42.88, 49.82)	NR	-5.07 (-14.08, -3.95); p=0.27	-28.79 (<0.001)
Scheer 2022	ITT	WPAI-overall	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	17.7 (SD 21.2)	NR	NR	NR
				Chronic MSK pain - Asian		910	15.9 (14.5, 17.2)	10.4 (8.2, 12.6)	NR; p=0.03	NR (0.745)
				Chronic MSK pain - Black		1,025	20.4 (18.7, 22.12)	10.9 (8.6, 13.2)	NR; p=0.003	NR (0.009)
				Chronic MSK pain - Hispanic		913	19.3 (17.6, 21.0)	12.6 (9.9, 15.3)	NR; p=0.01	NR (0.781)
				Chronic MSK pain - Non-Hispanic White		6,240	17.2 (16.6, 17.8)	11.0 (10.1, 11.8)	NR; p<.001	reference
				Chronic MSK pain - Other		462	18.5 (16.3, 20.7)	14.1 (10.8, 17.5)	NR; p=0.07	NR (0.565)
		WPAI-work	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	16.8 (SD 20.2)	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
				Chronic MSK pain - Asian		910	14.9 (13.6, 16.2)	9.2 (7.2, 11.2)	-5.7[1]; p=0.02	NR (0.760)
				Chronic MSK pain - Black		1,025	19.2 (17.5, 20.8)	9.9 (7.8, 12.0)	-9.3[1]; p=0.003	NR (0.013)
				Chronic MSK pain - Hispanic		913	18.1 (16.5, 19.7)	10.9 (8.5, 13.4)	-7.2[1]; p=0.01	NR (0.621)
				Chronic MSK pain - Non-Hispanic White		6,240	16.3 (15.8, 16.9)	10.0 (9.2, 10.8)	-6.3[1]; p<.001	reference
				Chronic MSK pain - Other		462	17.4 (15.3, 19.4)	12.3 (9.5, 15.1)	-5.1[1]; p=0.05	NR (0.772)
		WPAI-time	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	2.8 (SD 12.8)	NR	NR	NR
				Chronic MSK pain - Asian		910	2.2 (1.5, 2.9)	2.0 (0.8, 3.1)	-0.2[1]; p=0.97	NR (0.475
				Chronic MSK pain - Black		1,025	4.9 (3.6, 6.2)	2.7 (1.1, 4.3)	NR; p=0.44	NR (0.033)
				Chronic MSK pain - Hispanic		913	3.8 (2.7, 4.9)	3.2 (1.5, 4.9)	NR; p=0.16	NR (0.403)
				Chronic MSK pain - Non-Hispanic White		6,240	2.3 (2.0, 2.6)	2.6 (2.0, 3.2)	NR; p<.001	reference
				Chronic MSK pain - Other		462	4.8 (3.0, 6.5)	5.0 (1.7, 8.2)	NR; p=0.95	NR (0.926)
		WPAI-activity	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	29.3 (SD 25.3)	NR	NR	NR
				Chronic MSK pain - Asian		910	23.1 (21.6, 24.7)	12.5 (10.6, 14.5)	NR; p<.001	NR (0.283)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
				Chronic MSK pain - Black		1,025	30.0 (28.3, 31.7)	16.9 (14.5, 19.4)	NR; p<.001	NR (0.009)
				Chronic MSK pain - Hispanic		913	28.7 (27.0, 30.5)	15.0 (12.6, 17.3)	NR; p<.001	NR (0.781)
				Chronic MSK pain - Non-Hispanic White		6,240	29.8 (29.2, 30.4)	17.5 (16.6, 18.4)	NR; p<.001	reference
				Chronic MSK pain - Other		462	29.8 (27.5, 32.1)	19.5 (16.0, 22.8)	NR; p<.001	NR (0.565)
Scheer 2023b	ITT	WPAI-overall	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	19.5 (SD 21.8)	NR	-8.41 (-9.33, -7.48)	NR
		WPAI-work				5,749	18.16 (SD 20.3)	NR	-8.10 (-8.97, -7.24)	NR
		WPAI-time				5,749	2.5 (SD 9.0)	NR	-0.85 (-1.25, -0.44)	NR
		WPAI-activity				5,749	31 (SD 25)	NR	-15.1 (-15.99, -14.21)	NR
Costa 2022b	ITT	WPAI-overall	12 weeks	Acute low back pain	Sword Health	406	16.08 (13.70, 18.46)	5.41 (2.26, 8.55)	-10.67 (-14.37, -6.98)	NR
		WPAI-work				406	14.41 (12.33, 16.50)	5.37 (2.44, 8.31)	-9.04 (-12.28, -5.80)	NR
		WPAI-time				406	3.24 (1.81, 4.67)	0.19 (-0.09, 0.46)	-3.06 (-4.46, -1.66)	NR
		WPAI-activity				406	23.66 (21.34, 25.97)	5.98 (4.22, 7.74)	-17.68 (-20.28, -15.08)	NR
Janela 2022a	ITT	WPAI-overall	12 weeks	Chronic shoulder pain	Sword Health	296	13.97 (11.68, 16.27)	5.74 (3.47, 8.01)	-8.24 (-11.11, -5.37); p<0.001	NR
		WPAI-work				296	12.44 (10.34, 14.54)	5.58 (3.32, 7.85)	-6.86 (-9.72, -3.99); p<0.001	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
		WPAI-activity				296	23.03 (20.69, 25.37)	10.49 (7.87, 13.10)	-12.54 (-15.43, -9.65); p<0.001	NR
Janela 2022b	ITT	WPAI-overall	12 weeks	Chronic Hip Pain	Sword Health	430	15.82 (13.80, 17.84)	9.05 (6.35, 11.75)	-6.77 (-9.66, -3.89,)	NR
		WPAI-work				430	14.91 (13.00, 16.81)	9.05 (6.90, 11.47)	-5.86 (-8.80, -2.93,)	NR
		WPAI-activity				534	26.07 (23.94, 28.20)	14.68 (11.88, 17.47)	-11.39 (-14.38, -8.40,)	NR
Scheer 2023a	ITT	WPAI-overall	4-12 weeks	Acute & chronic MSK pain - Overall	Sword Health	9,992	17.32 (SD 21.26)	NR	NR	NR
				Acute & chronic MSK pain - Urban		8,809	17.23 (SD 21.25)	NR	-7.37 (-8.09, -6.65); p<0.001	0.18 (0.87)
				Acute & chronic MSK pain - Rural		1,183	17.9 (SD 21.39)	NR	-7.19 (-9.11, -5.28); p<0.001	reference
		WPAI-work	4-12 weeks	Acute & chronic MSK pain - Overall	Sword Health	9,992	16.27 (SD 20.05)	NR	NR	NR
				Acute & chronic MSK pain - Urban		8,809	16.16 (SD 20.0)	NR	-13.73 (-14.47, -12.99); p<0.001	0.15 (0.89)
				Acute & chronic MSK pain - Rural		1,183	17.04 (SD 20.35)	NR	-13.59 (-15.51, -11.67); p<0.001	reference
		WPAI-time	4-12 weeks	Acute & chronic MSK pain - Overall	Sword Health	9,992	1.91 (SD 8.07)	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference (P-value)
				Acute & chronic MSK pain - Urban		8,809	1.94 (SD 8.22)	NR	-7.14 (-7.81, -6.47); p<0.001	0.32 (0.75)
				Acute & chronic MSK pain - Rural		1,183	1.65 (SD 6.82)	NR	-6.82 (-8.63, -5); p<0.001	reference
		WPAI-activity	4-12 weeks	Acute & chronic MSK pain - Overall	Sword Health	9,992	29.04 (SD 25.46)	NR	NR	NR
				Acute & chronic MSK pain - Urban		8,809	28.92 (SD 25.45)	NR	-0.66 (-0.96, -0.37); p<0.001	0.24 (0.57)
				Acute & chronic MSK pain - Rural		1,183	29.93 (SD 25.48)	NR	-0.42 (-1.19, -0.34); p<0.001	reference

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, NR – not reported, PHQ-9 – Patient Health Questionnaire-9, SDI – social deprivation index, SD – standard deviation, WPAI – work productivity and activity impairment. 1. Calculated.

Appendix K-3: Anxiety in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
SWORD HEALTH										
Cui 2023	ITT	GAD-7	8 weeks	Chronic low back pain	Sword Health	70	median 3.79 (1.32, 5.88)	median 2.51 (0.00, 2.72)	median -1.28 (-4.35, -0.91)	median 0.00 (0.842)
					Control	70	median 4.22 (2.92, 5.51)	median 2.51 (1.36, 3.67)	median -1.70 (-2.16, -0.30)	reference
Pak 2023	ITT	GAD-7	8 weeks	Chronic shoulder pain	Sword Health	41	median 3 (IQR 4)	median 2.8 (2.1, 3.5)	median -0.6 (-1, -0.2); p=0.06	median -0.5 (0.3)
					Control	41	median 2 (IQR 6)	median 2.2 (1.7, 2.7)	median -1.1 (-1.6, -0.6); p=0.09	reference

Key: CI – confidence interval, GAD-7 – General anxiety disorder – 7, ITT – Intention-to-treat, C - Completers

Appendix K-4: Anxiety in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Wang 2022b	ITT	GAD-7, Score ≥10	1 year	Chronic MSK pain	Hinge Health	2,720	n (%) 461 (17.0)	n (%) NR (38.0)	NR	reference
					Control	1,650	n (%) 421 (25.5)	n (%) NR (57.8)	NR	19.8% (<0.001)
Bailey 2020	ITT	GAD-7	12 weeks	Chronic MSK pain	Hinge Health	10,264	3.93 (SD 5.50)	2.21 (3.83)	NR	NR
				Back pain cohort		6,468	4.39 (SD 5.69)	2.48 (3.99)	NR	NR
				Knee pain cohort		3,796	3.15 (SD 5.08)	1.77 (3.51)	NR	NR
Wang 2021	ITT	GAD-7, Score ≥10	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	n (%) 1308 (NR)	n (%): NR (79.28)	NR	reference
				Chronic MSK pain - Gen X		16,982	1603 (NR)	n (%): NR (81.16) [2]	NR	Adjusted OR 1.17 (not significant)
				Chronic MSK pain - Working age baby boomer		9,262	714 (NR)	n (%): NR (87.82) [2]	NR	Adjusted OR 2.05 (not significant)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	81 (NR)	n (%): NR (91.36) [2]	NR	Adjusted OR 2.71 (not significant)
SWORD HEALTH										
Areias 2023a	ITT	GAD-7, Scores ≥5	12 weeks	Chronic MSK pain - Young	Sword Health	4,629	9.15 (SD 4.1)	3.82 (95% CI 2.73, 4.90)	-5.21 (-6.28, -4.15); p<0.001	2.11 (0.08)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				adults (≤44 years old)						
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	8.54 (SD 3.9)	3.99 (95% CI 3.03, 4.95)	-4.26 (-5.22, -3.32); p<0.001	1.17 (0.33)
				Chronic MSK pain - Older adults (≥65 years old)		727	7.98 (SD 3.6)	4.90 (95% CI 3.06, 6.74)	-3.1 (-5.22, -0.98); p<0.001	reference
Areias 2023b	ITT	GAD-7	12 weeks	Chronic low back pain	Sword Health	560	2.93 (2.6, 3.27)	1.68 (95% CI 1.25, 2.11)	-1.25 (-1.70, -0.80)	NR
Areias 2023c	ITT	GAD-7	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	2.93 (2.8, 3.06)	1.69 (95% CI 1.54, 1.84)	-1.24 (-1.39, -1.08)	NR (not significant)
				Chronic MSK pain - SDI 20-40		2,903	3.43 (3.25, 3.61)	2.29 (95% CI 2.05, 2.52)	-1.14 (-1.37, -0.91)	NR (not significant)
				Chronic MSK pain - SDI 40-60		2,398	3.31 (3.12, 3.49)	2.16 (95% CI 1.94, 2.39)	-1.14 (-1.36, -0.92)	NR (not significant)
				Chronic MSK pain - SDI 60-80		1,874	3.46 (3.24, 3.67)	2.1 (95% CI 1.86, 2.34)	-1.36 (-1.6, -1.12)	NR (not significant)
				Chronic MSK pain - SDI 80-100		1,221	3.92 (3.63, 4.2)	2.27 (95% CI 1.97, 2.58)	-1.64 (-1.95, -1.34)	reference
Costa 2022a	ITT	GAD-7	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	1.44 (1.35, 1.53)	NR	-0.43 (-0.68, -0.18); p<0.001	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	5.44 (95% CI 5.07, 5.8)	3.18 (95% CI 2.31, 4.06)	-2.25 (-3.14, -1.36); p<0.001	-2.17 (<0.001)
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	10.73 (9.99, 11.47)	8.49 (95% CI 6.27, 10.71)	-2.24 (-4.49, 0.01); p=0.05	-7.47 (<0.001)
Janela 2023	ITT	GAD-7	8-12 Weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	2.83 (2.48, 3.18)	1.63 (95% CI 1.28, 1.98)	-1.19 (-1.56, -0.83)	NR
Scheer 2022	ITT	GAD-7	12 weeks	Chronic MSK pain - Asian	Sword Health	910	2.7 (2.4, 3.0)	1.5 (95% CI 1.2, 1.7)	NR; p=0.38	NR (0.254)
				Chronic MSK pain - Black		1,025	3.0 (2.7, 3.3)	1.8 (95% CI 1.5, 2.1)	NR; p=0.04	NR (0.345)
				Chronic MSK pain - Hispanic		913	4.0 (3.6, 4.3)	2.4 (95% CI 2.0, 2.8)	NR; p=0.39	NR (0.081)
				Chronic MSK pain - Non-Hispanic White		6,240	3.2 (3.1, 3.3)	2.1 (95% CI 2.0, 2.3)	NR; p<0.001	reference
				Chronic MSK pain - Other		462	3.3 (2.9, 3.8)	2.1 (95% CI 1.7, 2.7)	NR; p=0.09	NR (0.609)
Scheer 2023b	ITT	GAD-7	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	3.5 (SD 4.5)	NR	-1.36 (-1.49, -1.23)	NR
Costa 2022b	ITT	GAD-7	12 weeks	Acute low back pain	Sword Health	406	2.92 (2.56, 3.29)	1.33 (95% CI 0.98, 1.68)	-1.59 (- 1.98, -1.21)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
Costa 2022c	C	GAD-7, Score ≥5	12 weeks	Acute MSK pain	Sword Health	343	n (%) 70 (23.3)	NR	NR; p<0.001	NR
Janela 2022a	ITT	GAD-7	12 weeks	Chronic shoulder pain	Sword Health	296	3.34 (2.89, 3.79)	1.87 (95% CI 1.39, 2.35)	-1.47 (-1.99, -0.95); p<0.001	NR
Janela 2022b	ITT	GAD-7	12 weeks	Chronic Hip Pain	Sword Health	534	3.05 (2.68, 3.42)	1.92 (95% CI 1.51, 2.33)	-1.13 (-1.57, -0.68)	NR
Scheer 2023a	ITT	GAD-7	4-12 weeks	Acute & chronic MSK pain - Urban	Sword Health	8,809	3.04 (SD 4.35)	NR	-1.26 (-1.37, -1.16); p<0.001	0.1 (0.53)
				Acute & chronic MSK pain - Rural		1,183	2.98 (SD 4.37)	NR	-1.16 (-1.47, -0.86); p<0.001	reference
OTHER										
Fritz 2022	ITT	PROMIS-Anxiety	10 weeks	Chronic low back pain	Telehealth	88 [1]	mean 54.05 (SD 10.11)	54.84 (9.80)	-0.78 (-2.89, 1.33)	NR

Key: CI – confidence interval, GAD-7 – General anxiety disorder – 7, ITT – Intention-to-treat, C - Completers, NR – not reported, SDI – social deprivation index. 1. Patients who initiated telehealth PT. 2. % of patients who reported improvement in moderate or severe anxiety from baseline.

Appendix K-5: Depression in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
KAIA HEALTH										
Priebe 2020	C	DASS	3 months	Acute low back pain	Kaia Health	680	7.95 (SD 7.14)	7.62 (SD 7.59)	-0.33 (NR)[1]	NR
					Control	261	7.13 (SD 7.21)	8.84 (SD 8.07)	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
SWORD HEALTH										
Cui 2023	ITT	PHQ-9	8 weeks	Chronic low back pain	Sword Health	70	med 4.09 (0.45, 4.87)	med 3.22 (1.05, 3.67)	med -0.87 (-4.43, -0.51)	med 0.74 (0.302)
					Control	70	med 4.67 (3.54, 5.80)	med 2.48 (1.44, 3.52)	med -2.19 (-2.86, -1.14)	reference
Pak 2023	ITT	PHQ-9	8 weeks	Chronic shoulder pain	Sword Health	41	med 3 (IQR 4)	med 2.7 (2, 3.4)	-0.3 (NR)[1]; p<0.001	med -0.9 (<0.01)
					Control	41	med 2 (IQR 4)	med 1.6 (1.3, 1.9)	-0.4 (NR)[1]; p<0.001	reference

Key: CI – confidence interval, DASS – Depression Anxiety Stress Scales; ITT – Intention-to-treat, C - Completers, NR – not reported, PHQ-9 – Patient Health Questionnaire-9. Med - Median 1. Calculated.

Appendix K-6: Depression in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Wang 2022b	ITT	PHQ-8, Score ≥10	1 year	Chronic MSK pain - Moderate/Severe depression	Hinge Health	282	n (%) 282 (100)	n (%) 47 (52.8)	NR	35.7% (≤0.001)
				Chronic MSK pain - Moderate/Severe depression	Control	291	n (%) 291 (100)	n (%) 23 (88.5%)	NR	reference
Bailey 2020	ITT	PHQ-9	12 weeks	Chronic MSK pain	Hinge Health	10,264	3.05 (SD 5.34)	1.85 (3.97)	NR	NR
				Back pain cohort		6,468	3.35 (SD 5.49)	2.12 (4.12)	NR	NR
				Knee pain cohort		3,796	2.54 (SD 5.04)	1.43 (3.38)	NR	NR
Wang 2021	ITT	PHQ-9, Score ≥10	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	n (%) 967 (NR)	n (%) NR (78.39)[2]	NR	reference
				Chronic MSK pain - Gen X		16,982	n (%) 1304 (NR)	n (%) NR (77.76)[2]	NR	Adjusted OR 1.05 (not significant)
				Chronic MSK pain - Working age baby boomer		9,262	n (%) 647 (NR)	n (%) NR (81.14)[2]	NR	Adjusted OR 1.31 (not significant)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	n (%) 69 (NR)	n (%) NR (85.51)[2]	NR	Adjusted OR 1.47 (not significant)
SWORD HEALTH										
Areias 2023a	ITT	PHQ-9	12 weeks	Chronic MSK pain - Young adults	Sword Health	4,629	9.66 (SD 4.5)	4.25 (95% CI 2.74, 5.76)	-4.97 (-6.42, -3.53)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				(≤44 years old), PHQ-9 score ≥5						
				Chronic MSK pain - Middle-aged adults (45-64 years old), PHQ-9 score ≥5		6,726	9.07 (SD 4.2)	3.13 (95% CI 2.16, 4.10)	-4.94 (-5.94, -3.93)	NR
				Chronic MSK pain - Older adults (≥65 years old), PHQ-9 score ≥5		727	8.12 (SD 3.4)	4.79 (95% CI 2.47, 7.11)	-2.1 (-4.90, 0.70)	NR
Areias 2023b	ITT	PHQ-9	12 weeks	Chronic low back pain	Sword Health	560	2.86 (2.5, 3.22)	1.29 (95% CI 0.77, 1.82)	-1.57 (-2.12, -1.02)	NR
Areias 2023c	ITT	PHQ-9	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	2.23 (2.11, 2.36)	1.36 (95% CI 1.22, 1.5)	-0.87 (-1.02, -0.73); p<0.001	NR (not significant)
				Chronic MSK pain - SDI 20-40		2,903	2.82 (2.64, 3)	1.75 (95% CI 1.54, 1.96)	-1.07 (-1.29, -0.85); p<0.001	NR (not significant)
				Chronic MSK pain - SDI 40-60		2,398	2.73 (2.56, 2.91)	1.65 (95% CI 1.45, 1.85)	-1.09 (-1.29, -0.88); p<0.001	NR (not significant)
				Chronic MSK pain - SDI 60-80		1,874	2.96 (2.75, 3.18)	1.86 (95% CI 1.62, 2.1)	-1.1 (-1.35, -0.86); p<0.001	NR (not significant)
				Chronic MSK pain - SDI 80-100		1,221	3.22 (2.95, 3.5)	1.97 (95% CI 1.67, 2.27)	-1.25 (-1.55, -0.95); p<0.001	reference
Costa 2022a	ITT	PHQ-9	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	0.81 (0.77, 0.86)	NR	-0.03 (-0.25, 0.18); p=0.77	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	6.58 (6.44, 6.71)	3.22 (95% CI 2.31, 4.13)	-3.36 (-4.26, -2.45); p<0.001	-2.44 (<0.001)
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	13.98 (13.46, 14.5)	9.89 (95% CI 7.15, 12.62)	-4.09 (-6.87, -1.32); p=0.004	-9.11 (<0.001)
Janela 2023	ITT	PHQ-9	8-12 Weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	2.28 (1.98, 2.59)	1.34 (95% CI 1, 1.69)	-0.94 (-1.13, -0.58)	NR
Scheer 2022	ITT	PHQ-9	12 weeks	Chronic MSK pain - Asian	Sword Health	910	1.8 (1.6, 2.0)	1.1 (95% CI 0.9, 1.4)	NR; p=0.93	NR (0.811)
				Chronic MSK pain - Black		1,025	2.7 (2.4, 2.9)	1.8 (95% CI 1.5, 2.1)	NR; p=0.41	NR (0.636)
				Chronic MSK pain - Hispanic		913	2.8 (2.49, 3.1)	2.1 (95% CI 1.7, 2.5)	NR; p=0.28	NR (0.614)
				Chronic MSK pain - Non-Hispanic White		6,240	2.5 (2.4, 2.6)	1.8 (95% CI 1.7, 1.9)	NR; p=.001	reference
				Chronic MSK pain - Other		462	2.8 (2.3, 3.2)	2.0 (95% CI 1.5, 2.6)	NR; p=0.92	NR (0.933)
Scheer 2023b	ITT	PHQ-9	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	2.9 (SD 4.5)	NR	-1.12 (-1.26, -0.99)	NR
Costa 2022b	ITT	PHQ-9	12 weeks	Acute low back pain	Sword Health	406	2.37 (2.05, 2.70)	0.93 (95% CI 0.64, 1.22)	-1.45 (-1.78, -1.12)	NR
Costa 2022c	C	PHQ-9, Score ≥5	12 weeks	Acute MSK pain	Sword Health	343	n (%) 45 (15.0)	NR	NR; p<0.001	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
Janela 2022a	ITT	PHQ-9	12 weeks	Chronic shoulder pain	Sword Health	296	3.13 (2.75, 3.51)	1.47 (95% CI 1.12, 1.82)	-1.66 (-2.11, -1.21); p<0.001	NR
Janela 2022b	ITT	PHQ-9	12 weeks	Chronic Hip Pain	Sword Health	534	2.66 (2.29, 3.03)	1.55 (95% CI 1.22, 1.87)	-1.16 (-1.49, -0.75)	NR
Scheer 2023a	ITT	PHQ-9	4-12 weeks	Acute & chronic MSK pain - Urban	Sword Health	8,809	2.33 (SD 4.11)	NR	-0.93 (-1.03, -0.82)	-0.22 (0.19)
				Acute & chronic MSK pain - Rural		1,183	2.70 (SD 4.41)	NR	-1.14 (-1.45, -0.84)	reference
OTHER										
Fritz 2022	ITT	PROMIS-Depression	10 weeks	Chronic low back pain	Telehealth	88 [1]	51.28 (SD 9.49)	52.78 (9.69)	-1.96 (-3.86, -0.063)	NR

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, NR – not reported, PHQ-9 – Patient Health Questionnaire-9, SD – standard deviation, SDI – social deprivation index
1. Patients who initiated telehealth PT. 2. % of patients who reported improvement in moderate or severe depression from baseline.

Appendix K-7: Fear-Avoidance in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Mecklenburg 2018	ITT	NRS (Scale 0-10)	NR	Chronic knee pain	Hinge Health	101	6 (SD 6)	NR	NR	NR
					Control	54	6 (SD 11)	NR	NR	NR
SWORD HEALTH										
Cui 2023	ITT	FABQ-PA	8 weeks	Chronic low back pain	Sword Health	70	median 14.41 (12.06, 14.78)	median 12.48 (8.41, 12.71)	median -1.92 (-5.48, 2.48)	median 0.00 (0.928)
					Control	70	median 13.99 (12.50, 15.48)	median 12.48 (10.65, 14.32)	median -1.50 (-3.28, 0.03)	reference
OTHER										
Bates 2023[1]	C	TSK	8 weeks	Low back pain -Control	Control	9	37 (SD 2)	34 (SD 7)	NR; p not significant	NR
				Low back pain - Training	Tonal Systems, Inc.	13	39 (SD 5)	37 (SD 4)	NR; p not significant	NR
				Low back pain - Clinical	Control	27	38 (SD 5)	38 (SD 5)	NR; p=0.03	NR
				Low back pain – Combined Treatment	Tonal Systems, Inc.	20	40 (SD 5)	40 (SD 3)	NR; p not significant	NR

Key: CI – confidence interval, FABQ-PA – Fear-Avoidance Beliefs Questionnaire – Physical Activity Subscale, ITT – Intention-to-treat, C - Completers, NR – not reported. 1. Control arm: no treatment; Training arm: supervised artificial-intelligence-guided core-focused resistance training; Clinical arm: clinical care; Combined Treatment: both clinical care and artificial-intelligence-guided training.

Appendix K-8: Fear-Avoidance in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (95% CI)	At Follow-up Mean (95% CI)	Change from Baseline Mean (95% CI)	Between Group Difference Mean (P-value)
SWORD HEALTH										
Areias 2023b	ITT	FABQ-PA	12 weeks	Chronic low back pain	Sword Health	560	10.08 (9.57, 10.58)	6.52 (5.72, 7.32)	-3.56 (-4.37, -2.74)	NR
Costa 2022a	ITT	FABQ-PA	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	10.4 (10.18, 10.62)	NR	-2.63 (-3.17, -2.09); p<0.001	reference
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	11.49 (10.98, 12.01)	NR	-2.33 (-3.62, -1.04); p<0.001	-1.39 (0.05)
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	12.67 (11.92, 13.42)	NR	-0.7 (-2.84, 1.44); p=0.52	-4.2 (<0.001)
Janela 2023	ITT	FABQ-PA	8-12 Weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	18.02 (17.78, 18.26)	10.32 (9.51, 11.12)	-7.71 (-8.52, -6.89)	NR
Costa 2022b	ITT	FABQ-PA	12 weeks	Acute low back pain	Sword Health	406	11.21 (10.23, 12.18)	6.02 (5.15, 6.89)	-5.19 (-6.36, -4.01)	NR
Costa 2022c	C	FABQ-PA	12 weeks	Acute MSK pain	Sword Health	343	10.91 (SD 4.59)	NR	NR; p<0.001	NR
Janela 2022a	ITT	FABQ-PA	12 weeks	Chronic shoulder pain	Sword Health	296	11.70 (11.07, 12.32)	7.29 (6.48, 8.10)	-4.41 (-5.27, -3.55); p=0.002	NR

Key: CI – confidence interval, FABQ-PA – Fear-Avoidance Beliefs Questionnaire – Physical Activity Subscale, ITT – Intention-to-treat, C - Completers, NR – not reported, PHQ-9 – Patient Health Questionnaire-9.

Appendix K-9: Stress in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
KAIA HEALTH									
Priebe 2020	C	DASS	3 months	Acute low back pain	Kaia Health	680	12.12 (7.58)	10.75 (7.95)	Significant (NR)
					Control	261	11.34 (8.01)	12.61 (8.01)	

Key: DASS – Depression Anxiety Stress Scales, SD – standard deviation

Appendix K-10: Health-related Quality of Life in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD); p-value	Between Group Difference Mean (P-value)
HINGE HEALTH									
Shebib 2019	ITT	Impact on daily life, VAS	12 weeks	Chronic low back pain	Hinge Health	113	38.6 (26.6)	21.1 (20.7)	-11.8 (0.002)
					Control	64	43.9 (25.2)	38.2 (26.1)	reference
KAIA HEALTH									
Toelle 2019	C	VR-12 MCS	12 weeks	Acute & chronic low back pain	Kaia Health	42	44.38 (10.08)	48.69 (8.38); p<0.01	NR (n.s.)
					Control	44	44.56 (9.29)	47.64 (8.11); p<0.01	reference
		VR-12 PCS	12 weeks	Acute & chronic low back pain	Kaia Health	42	41.65 (8.00)	50.58 (6.86); p<0.01	NR (n.s.)
					Control	44	40.78 (8.18)	48.64 (8.22); p<0.01	reference
Priebe 2020	C	VR-12 MCS	3 months	Acute low back pain	Kaia Health	680	45.80 (10.96)	47.13 (11.22); p≤0.05	NR
			3 months		Control	261	47.12 (11.28)	45.09 (11.07); p≤0.05	NR
		VR-12 PCS	3 months	Acute low back pain	Kaia Health	680	40.65 (8.38)	46.06 (8.42); p≤0.05	NR
			3 months		Control	261	43.38 (8.16)	45.69 (8.00); p≤0.05	NR

Key: ITT – Intention-to-treat, C – Completers, NR – not reported, SD – standard deviation, VR-12 – Veterans RAND 12 Item Health Survey

Appendix K-11: Health-related Quality of Life in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (95% CI)
SWORD HEALTH									
Janela 2022b	ITT	HOOS-QoL	12 weeks	Chronic Hip Pain	Sword Health	515	52.44 (95% CI 50.86, 54.02)	66.52 (95% CI 64.22, 68.81)	14.08 (12.03, 16.12)
VORI HEALTH									
Woznica 2023	ITT	PROMIS-MH	81 days	Acute & chronic low back pain	Vori Health	36	45.5 (6.6)	NR	3.4; p=0.03
		PROMIS-PH	81 days	Acute & chronic low back pain		36	39.8 (7.0)	NR	4.7; p=0.009
OTHER									
Skolasky 2022	ITT	PROMIS-Social role participation	26 weeks	Chronic low back pain	Telehealth	31	45.9 (7.7)	47.8 (10.6)	NR
Fritz 2022	ITT	PROMIS-Fatigue	10 weeks	Chronic low back pain	Telehealth	88 [1]	55.62 (9.58)	55.47 (9.55)	-0.27 (-2.11, 1.57)
		PROMIS-Social role participation	10 weeks	Chronic low back pain	Telehealth	88[1]	44.20 (7.52)	46.01 (7.45)	-1.48 (-3.07, 0.12)
		PROMIS-Sleep disturbance	10 weeks	Chronic low back pain	Telehealth	88 [1]	55.52 (8.24)	53.37 (7.28)	-2.09 (0.57, 3.62)

Key: CI – confidence interval, MH – mental health, PH – physical health, PROMIS – Patient-Reported Outcomes Measurement Information System, SD – standard deviation
1. Patients who initiated telehealth PT.

Appendix K-12: HCRU in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up N (%)	Between Group Difference Mean (P-value)
HINGE HEALTH								
Wang 2022b	ITT	Conservative Care	1 year	Chronic MSK pain	Hinge Health	2,720	NR (24.5)	reference
					Control	1,650	NR (41.2)	16.7% (<0.05)
		Invasive & emergency care	1 year		Hinge Health	2,720	NR (7.4)	reference
					Control	1,650	NR (13.1)	5.7% (<0.05)
		Imaging	1 year		Hinge Health	2,720	NR (10.2)	reference
					Control	1,650	NR (18.3)	8.1% (<0.05)
SWORD HEALTH								
Areias 2022	C	Conservative care	1 year	Chronic MSK pain	Sword Health	310	NR (14.8)	NR (0.041)
					Control	150	NR (21.3)	reference
		Invasive & emergency care	1 year		Sword Health	310	NR (6.1)	NR (0.068)
					Control	150	NR (10.0)	reference
VORI HEALTH								
Woznica 2023	ITT	Medication scripts	81 days	Acute & chronic low back pain	Vori Health	36	6 (16.7)	NR

Key: ITT – Intention-to-treat, C - Completers, NR – not reported

Appendix K-13: Medication Use in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline N (%)	At Follow-up N (%)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Mecklenburg 2018	ITT	Opioids	NR	Chronic knee pain	Hinge Health	101	5 (5)	NR	NR	NR
					Control	54	3 (6)	NR	NR	NR
Shebib 2019	ITT	Opioids	NR	Chronic low back pain	Hinge Health	113	NR (10)	NR	NR	NR
					Control	64	NR (8)	NR	NR	NR
KAIA HEALTH										
Toelle 2019	C	MQS	12 weeks	Acute & chronic low back pain	Kaia Health	42	mean 2.4 (SD 3.31)	mean 0.9 (SD 2.40)	NR	NR (0.11)
					Control	44	mean 2.8 (SD 3.59)	mean 1.9 (SD 3.01)	NR	reference
SWORD HEALTH										
Cui 2023	ITT	Opioids	8 weeks	Chronic low back pain	Sword Health	70	9/34 (26.5)	NR	NR	OR 0.26 (0.985)
					Control	70	7/43 (16.3)	NR	NR	reference
		Analgesics	8 weeks	Chronic low back pain	Sword Health	70	34 (NR)	NR	NR; P=0.515	OR 0.92 (0.081)
					Control	70	43 (NR)	NR	NR; P=0.076	reference
Pak 2023	ITT	Analgesics	8 weeks	Chronic shoulder pain	Sword Health	41	2 (4.9)	NR	NR	NR
					Control	41	7 (17.1)	NR	NR	NR
		Opioids	8 weeks	Chronic shoulder pain	Sword Health	41	0 (0)	NR	NR	NR
					Control	41	1 (2.4)	NR	NR	NR

Key: ITT – Intention-to-treat, C - Completers, MQS – medication quantification scale, NR – not reported, OR – odds ratio, SD – standard deviation

Appendix K-14: Medication Use in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline N (%)	At Follow-up n (%) or Mean (95% CI)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Wang 2023	ITT	Opioids	1 year	Chronic MSK pain	Hinge Health	4,195	NR	NR (7.89%)	NR	-5.74% (<0.001)
					Control	4,195	NR	NR (13.64%)	NR	reference
		Opioids, scripts per 100 persons	1 **year**	Chronic MSK pain	Hinge Health	4,195	NR	16.73 (14.11, 19.36)	NR	-5.63 (0.002)
					Control	4,195	NR	22.36 (19.99, 24.73)	NR	reference
SWORD HEALTH										
Areias 2023a	ITT	Analgesics	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	16	NR	NR	NR
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	NR (27.1)	NR	NR	NR
				Chronic MSK pain - Older adults (≥65 years old)		727	NR (34.3)	NR	NR	NR
		Probability of consuming analgesics		Chronic MSK pain - Young adults (≤44 years old)		4,629	mean 0.159 (95% CI 0.157, 0.160)	0.119 (0.117, 0.120)	-0.040 (NR); p<0.001	NR (0.36)
				Chronic MSK pain - Middle-aged adults		6,726	mean 0.272 (95% CI 0.270, 0.275)	0.216 (0.214, 0.218)	-0.056 (NR); p<0.001	NR (0.30)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline N (%)	At Follow-up n (%) or Mean (95% CI)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
				(45-64 years old)						
				Chronic MSK pain - Older adults (≥65 years old)		727	mean 0.352 (95% CI 0.349, 0.354)	0.26 (0.258, 0.263)	-0.091 (NR); p<0.001	reference
Areias 2023b	ITT	Analgesics	12 weeks	Chronic low back pain	Sword Health	560	119 (21.3)	27 (14.7%)	92 (6.6%)	NR
Areias 2023c	ITT	Analgesics	4-12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3,666	792 (21.6)	NR (17%)	-11 (95% CI -19, -3); p=0.007	NR
				Chronic MSK pain - SDI 20-40		2,903	655 (22.6)	NR (17%)	-13 (95% CI -22, -5); p=0.003	NR
				Chronic MSK pain - SDI 40-60		2,398	615 (25.6)	NR (21%)	-17 (95% CI -27, -7); p=0.001	NR
				Chronic MSK pain - SDI 60-80		1,874	451 (24.1)	NR (21%)	-14 (95% CI -25, -2); p=0.026	NR
				Chronic MSK pain - SDI 80-100		1,221	294 (24.1)	NR (18%)	-22 (95% CI -37, -6.3); p=0.006	NR
Costa 2022a	ITT	Analgesics	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	1861 (30.3)	NR	NR	NR
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	464 (40.1)	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline N (%)	At Follow-up n (%) or Mean (95% CI)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	212 (43.3)	NR	NR	NR
Costa 2022b	ITT	Analgesics	12 weeks	Acute low back pain	Sword Health	406	144 (35.7)	12 (10.8%)	NR	NR
Costa 2022c	C	Analgesics	12 weeks	Acute MSK pain	Sword Health	343	NR (43.6)	NR (37.0%)	NR; p<0.001	NR
Janela 2022a	ITT	Analgesics	12 weeks	Chronic shoulder pain	Sword Health	296	108 (36.5)	33 (55.9%)	NR	NR

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, NR – not reported, PHQ-9 – Patient Health Questionnaire-9, SD – standard deviation, SDI – social deprivation index

Appendix K-15: Surgery Intent in Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (95% CI)	Change from Baseline Median (95% CI)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Mecklenburg 2018	ITT	NRS (Scale 0-10)	12 weeks	Chronic knee pain	Hinge Health	101	3.03 (3.41)	1.92 (SD 2.93)	NR	-1.0 (0.01)
					Control	54	3.02 (3.32)	2.89 (SD 3.21)	NR	reference
OTHER										
Shebib 2019	ITT	NRS (Scale 0-10)	12 weeks	Chronic low back pain	DHT	113	0.894 (1.71)	0.619 (SD 1.35)	NR	-0.4 (0.01)
					Control	64	1.39 (2.55)	1.53 (SD 2.67)	NR	reference
SWORD HEALTH										
Pak 2023	ITT	NRS (Scale 0-10)	8 weeks	Chronic shoulder pain	Sword Health	41	median 0 (IQR 4)	median 6.3 (0, 23.2)	-1.6 (-13.4, 10.2); p=0.83	1.4 (0.94)
					Control	41	median 1 (IQR 15)	median 7.2 (0, 25.1)	-2.7 (-22.7, 17.3); p=0.79	reference
Cui 2023	ITT	NRS (Scale 0-100)	8 weeks	Chronic low back pain	Sword Health	70	median 6.43 (95% CI 0.00, 20.68)	median 0.06 (0.00, 1.49)	-6.37 (-25.06, -2.92)	0.00 (0.372)
					Control	70	median 9.76 (95% CI 4.88, 14.64)	median 0.06 (0.00, 4.77)	-9.69 (-13.60, -4.38)	reference

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, NR – not reported, NRS – numerical rating scale

Appendix K-15: Surgery Intent in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH										
Bailey 2020	ITT	NRS (Scale 0-100)	12 weeks	Chronic MSK pain	Hinge Health	10,264	12.67 (21.55)	4.14 (12.44)	-8.15; p<0.001	NR
				Back pain cohort		6,468	9.07 (17.89)	2.88 (9.26)	NR	NR
				Knee pain cohort		3,796	18.80 (25.51)	6.26 (16.1)	NR	NR
Smittenaar 2017	ITT	NRS (Scale 0-10)	12 weeks	Chronic knee pain	Hinge Health	41	3.5	1.2	mean -2.3 (-3.1, -1.5); p<0.001	NR
			6 months			41	3.5	NR	mean -2.4 (-3.2, -1.6); p<0.001	NR
SWORD HEALTH										
Costa 2022a	ITT	NRS (Scale 0-100)	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	10.26 (19.52)	NR	NR	NR
				Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	11.97 (21.41)	NR	NR	NR
				Acute & chronic MSK pain - PHQ-9 score ≥10		490	17.32 (26.86)	NR	NR	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up Mean (SD)	Change from Baseline Mean (SD)	Between Group Difference Mean (P-value)
Scheer 2022	ITT	NRS (Scale 0-100)	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	10.3 (20.1)	NR	NR	NR
				Chronic MSK pain - Asian		910	1.3 (95% CI 6.3, 8.2)	4.7 (3.2, 6.2)	NR; p=0.020	NR (0.245)
				Chronic MSK pain - Black		1,025	12.8 (95% CI 11.4, 14.2)	7.5 (5.6, 9.3)	NR; p=0.004	NR (0.074)
				Chronic MSK pain - Hispanic		913	10.8 (95% CI 9.5, 12.1)	5.4 (4.0, 6.8)	NR; p<0.001	NR (0.007)
				Chronic MSK pain - Non-Hispanic White		6,240	10.3 (95% CI 9.8, 10.7)	6.9 (6.2, 7.3)	NR; p<0.001	reference
				Chronic MSK pain - Other		462	8.0 (95% CI 6.4, 9.7)	4.6 (2.4, 6.8)	NR; p=0.03	NR (0.946)
Costa 2022b	ITT	NRS (Scale 0-100)	12 weeks	Acute low back pain	Sword Health	406	4.73 (95% CI 3.63, 5.82)	1.80 (0.49, 3.11)	mean -2.92 (-4.44, -1.41); p<.001	NR
Costa 2022c	C	NRS (Scale 0-100)	12 weeks	Acute MSK pain	Sword Health	343	5.82 (10.98)	NR	NR; p<0.001	NR
tJanela 2022a	ITT	NRS (Scale 0-100)	12 weeks	Chronic shoulder pain	Sword Health	296	13.27 (95% CI 10.87, 15.68)	6.16 (3.60, 8.73)	mean -7.11 (-9.86, -4.36)	NR
Janela 2022b	ITT	NRS (Scale 0-100)	12 weeks	Chronic Hip Pain	Sword Health	534	8.84 (95% CI 7.14, 10.54)	3.16 (95% CI 1.67, 4.65)	5.68 (95% CI 4.01, 7.34)	NR

Key: CI – confidence interval, ITT – Intention-to-treat, C - Completers, NR – not reported, NRS – numerical rating scale, PHQ-9 – Patient Health Questionnaire-9

Appendix L – User Experience Outcomes in SLR

Appendix L-1: Adherence in Interventional Trials

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up N (%)	Between Group Difference Mean (P-value)
HINGE HEALTH									
Mecklenburg 2018	ITT	Retention Rate	12 weeks	Chronic knee pain	Hinge Health	101	NR	58 (57.4)[1]	NR
					Control	54	NR	36 (66.7)[1]	NR
Shebib 2019	ITT	Retention Rate	12 weeks	Chronic low back pain	Hinge Health	113	NR	69 (61.0)[1]	NR
					Control	64	NR	36 (56.3)[1]	NR
KAIA HEALTH									
Priebe 2020	C	DASS	12 weeks	Acute low back pain	Kaia Health	680	5.71 (5.84)	mean 5.47 (SD 5.90)	NR
					Control	261	5.13 (5.51)	mean 6.44 (SD 6.23)	NR
		Drop-out Rate	12 weeks	Acute low back pain	Kaia Health	680	NR	253 (27.2)	NR
					Control	261	NR	51 (16.4)	NR
Toelle 2019	C	Retention Rate	12 weeks	Acute & chronic low back pain	Kaia Health	53	NR	42 (79.2) [1]	NR
					Control	48	NR	44 (91.7) [1]	NR
LIMBER HEALTH									
Gruner 2021	C	Retention Rate	8 weeks	Acute & chronic knee pain	Limber Health	31	NR	24 (77.4) [1]	NR
					Control	29	NR	26 (89.7) [1]	NR

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	Baseline Mean (SD)	At Follow-up N (%)	Between Group Difference Mean (P-value)
SWORD HEALTH									
Cui 2023	ITT	Drop-out Rate	8 weeks	Chronic low back pain	Sword Health	70	NR	11 (15.7)	NR (0.019)
					Control	70	NR	24 (34.3)	reference
Pak 2023	ITT	Retention Rate	8 weeks	Chronic shoulder pain	Sword Health	41	NR	39 (95.1)[1]	NR (0.14)
					Control	41	NR	35 (85.4)[1]	reference

Key: ITT, intention-to-treat, NR – not reported, SD – standard deviation
1. Calculated. 2. Pain duration not specified.

Appendix L-2: Adherence in Observational Studies

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up n (%)	Between Group Difference Mean (P-value)
HINGE HEALTH								
Bailey 2020	ITT	Retention Rate	12 weeks	Chronic MSK pain	Hinge Health	10,264	7497 (73.04)	NR
		Duration in program, weeks	12 weeks	Chronic MSK pain		10,264	8.46 (3.9)	NR
				Back pain cohort		6,468	8.36 (3.92)	NR
				Knee pain cohort		3,796	8.63 (3.86)	NR
Wang 2021	ITT	Retention Rate	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	NR (66.91)	reference
				Chronic MSK pain - Gen X		16,982	NR (75.51)	Adjusted OR 1.62 (≤0.05)
				Chronic MSK pain - Working age baby boomer		9,262	NR (81.53)	Adjusted OR 2.24 (≤0.05)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	NR (83.02)	Adjusted OR 2.36 (≤0.05)
Smittenaar 2017	ITT	Retention Rate	6 weeks	Chronic knee pain	Hinge Health	41	37 (90)	NR
			12 weeks			41	33 (80)	NR
OMADA HEALTH								
Beresford 2022a	C	Duration in program, weeks	NR	Acute & chronic MSK pain	Omada Health	814	Mean (SD): 9.09 (5.36)	NR
SWORD HEALTH								
Areias 2023a	ITT	Drop-out Rate	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	1471 (31.8) [1]	NR

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up n (%)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	1421 (21.1) [1]	NR
				Chronic MSK pain - Older adults (≥65 years old)		727	107 (14.7) [1]	NR
Areias 2023b	ITT	Retention Rate	12 weeks	Chronic low back pain	Sword Health	560	439 (78.4)	NR
Areias 2023c	ITT	Drop-out Rate	12 weeks	Chronic MSK pain - SDI 0-20	Sword Health	3666	810 (22.1)	NR
				Chronic MSK pain - SDI 20-40		2903	669 (23.1)	NR
				Chronic MSK pain - SDI 40-60		2398	639 (26.7)	NR
				Chronic MSK pain - SDI 60-80		1874	522 (27.9)	NR
				Chronic MSK pain - SDI 80-100		1221	353 (28.9)	NR
Janela 2023	ITT	Retention Rate	8-12 weeks	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	392 (75.4)	NR
Scheer 2022	ITT	Retention Rate	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	6949 (72.8)	NR
		Drop-out Rate	12 weeks	Chronic MSK pain - Asian	Sword Health	910	184 (20)	OR 1.03 (not significant)
				Chronic MSK pain - Black		1,025	231 (23)	OR 1.14 (not significant)
				Chronic MSK pain - Hispanic		913	232 (25)	OR 1.19 (0.04)

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up n (%)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Non-Hispanic White		6,240	1224 (20)	reference
				Chronic MSK pain - Other		462	94 (20)	OR 0.95 (not significant)
Scheer 2023a	ITT	Retention Rate	4-12 weeks	Acute & chronic MSK pain - Urban	Sword Health	8,809	6472 (73.5)	NR (0.02)
				Acute & chronic MSK pain - Rural		1,183	906 (76.6)	reference
Scheer 2023b	ITT	Drop-out Rate	12 weeks	Acute & chronic MSK pain	Sword Health	5,749	1250 (21.7)[1]	NR
Costa 2022a	ITT	Drop-out Rate	12 weeks	Acute & chronic MSK pain	Sword Health	7,785	1362 (17.5)[1]	NR
Costa 2022b	ITT	Drop-out Rate	12 weeks	Acute low back pain	Sword Health	406	58 (14.3)[1]	NR
Costa 2022c	ITT	Retention Rate	12 weeks	Acute MSK pain	Sword Health	343	300 (87.5)	NR
Janela 2022a	ITT	Drop-out Rate	8 weeks	Chronic shoulder pain	Sword Health	296	50 (16.9)	NR
Janela 2022b	ITT	Retention Rate	12	Chronic Hip Pain	Sword Health	534	396 (74.2)	NR
OTHER								
Fritz 2022	ITT	Retention Rate	26 weeks	Chronic low back pain	Teleheal th	88	72 (81.0)	NR
Delgado 2023	ITT	Duration in program, days	12 weeks	Chronic MSK pain	Simple Therapy	3,109	median 51 (IQR 14-300)	NR

Key: FABQ-PA – Fear-Avoidance Beliefs Questionnaire – Physical Activity Subscale, ITT, intention-to-treat, NR – not reported, OR – odds ratio, PHQ-9 - Patient Health Questionnaire-9, SD – standard deviation, SDI – Social Deprivation Index. 1. Calculated.

Appendix L-3: Patient Engagement in Interventional Trials

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH								
Mecklenburg 2018	C	Exercise sessions, per week	12 weeks	Chronic knee pain	Hinge Health	101	3.3 (NR)	NR
		Exercise sessions, total	12 weeks		Hinge Health	101	42.9 (17.3)	NR
		Educational Materials Utilized, total	12 weeks		Hinge Health	101	9.6 (3.1)	NR
		CBT utilization, total	12 weeks		Hinge Health	101	1.8 (1.1)	NR
		Text messages exchanged, total	12 weeks		Hinge Health	101	6.6 (5.7)	NR
Shebib 2019	C	Exercise sessions, total	12 weeks	Chronic low back pain	Hinge Health	113	44.8 (26.7)	NR
		Exercise sessions, per week	12 weeks		Hinge Health	113	3.8 (NR)	NR
		Educational Materials Utilized, total	12 weeks		Hinge Health	113	9.2 (3.3)	NR
		CBT utilization, total	12 weeks		Hinge Health	113	1.7 (1.1)	NR
KAIA HEALTH								
Toelle 2019	C	App utilized, days	12 weeks	Acute & chronic low back pain	Kaia Health	42	35 (22)	NR
	C	Exercise sessions, total	12 weeks		Control	44	5.39 (1.22)	NR
		Educational Materials Utilized, % Participants	12 weeks		Control	44	NR (41%)	NR
SWORD HEALTH								

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
Cui 2023	ITT	Exercise sessions, total	8 weeks	Chronic low back pain	Sword Health	70	22.32 (9.46)	NR
					Control	70	12.42 (4.95)	NR
		Exercise sessions, per week	8 weeks		Sword Health	70	2.79 (1.18)	NR
					Control	70	1.55 (0.62)	NR
		Training time, total minutes	8 weeks		Sword Health	70	451.78 (227.36)	NR (0.662)
					Control	70	385.98 (145.36)	reference
		Educational Materials Utilized, total	8 weeks		Sword Health	70	median 4.0 (IQR 6.0)	NR
					Control	70	NR	NR
		CBT utilization, total	8 weeks		Sword Health	70	median 6.0 (IQR 7.3)	NR
					Control	70	NR	NR
		Interactions with PT, total	8 weeks		Sword Health	70	2.8 (3.0)	NR
					Control	70	NR	NR
		Text messages exchanged, total	8 weeks		Sword Health	70	19.0 (11.8)	NR
					Control	70	NR	NR
Pak 2023	ITT	Training time, total minutes	8 weeks	Chronic shoulder pain	Sword Health	41	461.6 (218.2)	NR
					Control	41	393.9 (118.8)	NR

Citation	Analysis	Outcome	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
		Exercise sessions, per week	8 weeks		Sword Health	41	3.3 (1.4)	NR
					Control	41	1.68 (0.4)	NR
LIMBER HEALTH								
Gruner 2021	C	Exercise sessions, per week	8 weeks	Acute & chronic knee pain	Limber Health	24	2.6 (1.1)	NR (>0.05)
					Control	26	3.2 (1.7)	reference
OTHER								
Lentz 2023	ITT [1]	Interactions with PT, total [2]	6 weeks	Chronic low back pain	AIM-Back SCP	396	2.8 (2)	NR
			12 weeks	Chronic low back pain - Medium to high risk of persistent disability	AIM-Back SCP	167	2.5 (2)	NR

Key: CBT – cognitive behavioral therapy, IQR – interquartile ratio, ITT – Intention-to-treat, C - Completers, NR – not reported, PT – physical therapist, SD – standard deviation
1. At least 3 months past initial on-site PT visit. 2. Physical activity calls, maximum 6 possible during weeks 1-6 of program.

Appendix L-4: Patient Engagement in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
HINGE HEALTH								
Wang 2022a	ITT	Exercise sessions, total	12 weeks	Acute MSK pain	Hinge Health	262	17.7 (21.2)	NR
		Interactions with PT, total				262	1.8 (1.1)	NR
Bailey 2020	ITT	Exercise sessions, total	12 weeks	Chronic MSK pain	Hinge Health	10,264	27.43 (20.56)	NR
				Back pain cohort		6,468	26.48 (20.45)	NR
				Knee pain cohort		3,796	29.04 (20.65)	NR
		Exercise sessions, per week	12 weeks	Chronic MSK pain		10,264	2.93 (1.47)	NR
				Back pain cohort		6,468	2.85 (1.46)	NR
				Knee pain cohort		3,796	3.05 (1.47)	NR
		Educational Materials Utilized, total	12 weeks	Chronic MSK pain		10,264	15.33 (13.27)	NR
				Back pain cohort		6,468	14.81 (13.00)	NR
				Knee pain cohort		3,796	16.24 (13.67)	NR
		Educational Materials Utilized, weekly	12 weeks	Chronic MSK pain		10,264	2.24 (1.55)	NR
				Back pain cohort		6,468	2.2 (1.55)	NR
				Knee pain cohort		3,796	2.31 (1.56)	NR
		Text messages exchanged, total	12 weeks	Chronic MSK pain		10,264	84.08 (43.3)	NR
				Back pain cohort		6,468	83.55 (42.02)	NR
				Knee pain cohort		3,796	84.97 (45.36)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
		Interactions with PT, per week	12 weeks	Chronic MSK pain		10,264	7.03 (3.21)	NR
				Back pain cohort		6,468	6.99 (3.09)	NR
				Knee pain cohort		3,796	7.09 (3.39)	NR
Wang 2021	ITT	Exercise sessions, total	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	25.86	reference
				Chronic MSK pain - Gen X		16,982	33.35	Adjusted OR 1.34 (≤0.05)
				Chronic MSK pain - Working age baby boomer		9,262	41.2	Adjusted OR 1.62 (≤0.05)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	45.26	Adjusted OR 1.69 (≤0.05)
		Educational Materials Utilized, total	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	12.57	reference
				Chronic MSK pain - Gen X		16,982	17.61	Adjusted OR 1.41 (≤0.05)
				Chronic MSK pain - Working age baby boomer		9,262	22.85	Adjusted OR 1.8 (≤0.05)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	23.73	Adjusted OR 1.84 (≤0.05)
		Text messages exchanged, total	12 weeks	Chronic MSK pain - Gen Z or millennial	Hinge Health	13,535	16.43	reference
				Chronic MSK pain - Gen X		16,982	19.35	Adjusted OR 1.17 (≤0.05)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Working age baby boomer		9,262	21.17	Adjusted OR 1.28 (≤0.05)
				Chronic MSK pain - Retiree age baby boomer and silent generation		1,462	20.86	Adjusted OR 1.26 (≤0.05)
Smittenaar 2017	ITT	Educational Materials Utilized, total	12 weeks	Chronic knee pain	Hinge Health	41	10.7 (2.1)	NR
		CBT utilization, total	12 weeks			41	1.9 (0.8)	NR
		Exercise sessions, total	12 weeks			41	42.9 (16.1)	NR
		Exercise sessions, per week	12 weeks			41	3.6	NR
OMADA HEALTH								
Beresford 2022a	C	Interactions with PT, total [1]	NR	Acute & chronic MSK pain	Omada Health	814	2.11 (2.99)	NR
		Exercise sessions, per week	NR			814	2.78 (2.19)	NR
SWORD HEALTH								
Areias 2023a	ITT	Exercise sessions, per week	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	2.4 (0.9)	NR (<0.001)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	2.7 (1.1)	NR (<0.001)
				Chronic MSK pain - Older adults (≥65 years old)		727	3.1 (1.2)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Older adults (≥65 years old) with lower education levels [2]		NR	3.0 (1.2)	reference
				Chronic MSK pain - Older adults (≥65 years old) with higher education levels [3]		NR	3.1 (1.2)	NR (0.10)
		Training time, total minutes	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	320.6 (354.7)	NR (<0.001)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	473.9 (524.6)	NR (<0.001)
				Chronic MSK pain - Older adults (≥65 years old)		727	698.5 (740.4)	reference
				Chronic MSK pain - Older adults (≥65 years old) with lower education levels [2]		NR	640.5 (599.3)	reference
				Chronic MSK pain - Older adults (≥65 years old) with higher education levels [3]		NR	649.3 (705.5)	NR (0.09)
		Educational Materials Utilized, total	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	2.2 (4.3)	NR (<0.001)
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	3.3 (6.0)	NR (0.05)
				Chronic MSK pain - Older adults (≥65 years old)		727	3.9 (6.7)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Older adults (≥65 years old) with lower education levels [2]		NR	3.5 (6.1)	reference
				Chronic MSK pain - Older adults (≥65 years old) with higher education levels [3]		NR	3.7 (6.6)	NR (0.38)
		Interactions with PT, total	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	10.7 (14.7)	reference
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	11.8 (16.7)	NR (0.004)
				Chronic MSK pain - Older adults (≥65 years old)		727	12.6 (18.4)	NR (0.02)
				Chronic MSK pain - Older adults (≥65 years old) with lower education levels [2]		NR	13.5 (20.1)	reference
				Chronic MSK pain - Older adults (≥65 years old) with higher education levels [3]		NR	11.8 (16.5)	NR (0.32)
Areias 2023b	ITT	Exercise sessions, per week	12 weeks	Chronic low back pain	Sword Health	560	2.9 (1.0)	NR
		Training time, total minutes				560	448.2 (238.5)	NR
		Interactions with PT, total				560	12.9 (13.6)	NR
		Educational Materials Utilized, total				560	5.0 (7.3)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
Areias 2023c	ITT	Exercise sessions, total	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	median 21.0 (IQR 34.0)	NR
				Chronic MSK pain - SDI 0-20		3,666	median 23.0 (IQR 35.0)	NR
				Chronic MSK pain - SDI 20-40		2,903	median 22.0 (IQR 35.0)	NR
				Chronic MSK pain - SDI 40-60		2,398	median 20.0 (IQR 35.0)	NR
				Chronic MSK pain - SDI 60-80		1,874	median 19.0 (IQR 36.0)	NR
				Chronic MSK pain - SDI 80-100		1,221	median 17.0 (IQR 30.0)	NR
		Training time, total minutes	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	median 268.1 (IQR 477.7)	NR
				Chronic MSK pain - SDI 0-20		3,666	median 297.0 (IQR 494.8)	NR
				Chronic MSK pain - SDI 20-40		2,903	median 289.0 (IQR 490.0)	NR
				Chronic MSK pain - SDI 40-60		2,398	median 257.0 (IQR 477.8)	NR
				Chronic MSK pain - SDI 60-80		1,874	median 239.6 (IQR 472.4)	NR
				Chronic MSK pain - SDI 80-100		1,221	median 216.2 (IQR 398.1)	NR
		Exercise sessions, per week	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	median 2.4 (IQR 1.5)	NR
				Chronic MSK pain - SDI 0-20		3,666	median 2.5 (IQR 1.5)	NR
				Chronic MSK pain - SDI 20-40		2,903	median 2.5 (IQR 1.5)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - SDI 40-60		2,398	median 2.4 (IQR 1.5)	NR
				Chronic MSK pain - SDI 60-80		1,874	median 2.4 (IQR 1.5)	NR
				Chronic MSK pain - SDI 80-100		1,221	median 2.3 (IQR 1.3)	NR
		Educational Materials Utilized, total	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	median 1.0 (IQR 3.0)	NR
				Chronic MSK pain - SDI 0-20		3,666	median 1.0 (IQR 3.0)	NR
				Chronic MSK pain - SDI 20-40		2,903	median 1.0 (IQR 3.0)	NR
				Chronic MSK pain - SDI 40-60		2,398	median 1.0 (IQR 3.0)	NR
				Chronic MSK pain - SDI 60-80		1,874	median 1.0 (IQR 3.0)	NR
				Chronic MSK pain - SDI 80-100		1,221	median 1.0 (IQR 3.0)	NR
		Interactions with PT, total	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	median 10.0 (IQR 17.0)	NR
				Chronic MSK pain - SDI 0-20		3,666	median 10.0 (IQR 19.0)	NR
				Chronic MSK pain - SDI 20-40		2,903	median 10.0 (IQR 18.0)	NR
				Chronic MSK pain - SDI 40-60		2,398	median 9.0 (IQR 17.0)	NR
				Chronic MSK pain - SDI 60-80		1,874	median 9.0 (IQR 18.0)	NR
				Chronic MSK pain - SDI 80-100		1,221	median 10.0 (IQR 16.0)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
Costa 2022a	ITT	Exercise sessions, per week	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	2.7 (1.39)	NR
		Training time, total minutes	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	552.4 (537.4)	NR
		Interactions with PT, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	9.1 (11.6)	NR
		Text messages exchanged, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	23.3 (26.86)	NR
		Educational Materials Utilized, weekly	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5		6,137	4.24 (7.0)	NR
		Exercise sessions, per week	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	2.6 (1.31)	NR
		Training time, total minutes	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	479.1 (473.6)	NR
		Interactions with PT, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	8.8 (11.5)	NR
		Text messages exchanged, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	24.37 (27.2)	NR
		Educational Materials Utilized, weekly	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score 5-10		1,158	4.56 (6.9)	NR
		Exercise sessions, per week	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	2.6 (1.32)	NR
		Training time, total minutes	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	384.7 (392.6)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
		Interactions with PT, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	10 (11.7)	NR
		Text messages exchanged, total	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	28.37 (29.65)	NR
		Educational Materials Utilized, weekly	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score ≥10		490	4.32 (7.2)	NR
Scheer 2022	ITT	Exercise sessions, per week	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	2.6 (1.1)	NR
				Chronic MSK pain - Asian		910	2.6 (1.1)	NR
				Chronic MSK pain - Black		1,025	2.4 (1.1)	NR (<0.001)
				Chronic MSK pain - Hispanic		913	2.4 (0.9)	NR (<0.001)
				Chronic MSK pain - Non-Hispanic White		6,240	2.7 (1.1)	reference
				Chronic MSK pain - Other		462	2.5 (1.0)	NR (0.003)
		Exercise sessions, total	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	24.3 (20.0)	NR
				Chronic MSK pain - Asian		910	24.7 (20.3)	NR
				Chronic MSK pain - Black		1,025	21.6 (19.8)	NR (<0.001)
				Chronic MSK pain - Hispanic		913	20.5 (17.3)	NR (<0.001)
				Chronic MSK pain - Non-Hispanic White		6,240	25.4 (20.3)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Other		462	22.1 (18.8)	NR (0.001)
		Training time, total minutes	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	285.6 (238.9)	NR
				Chronic MSK pain - Asian		910	288.4 (236.5)	NR
				Chronic MSK pain - Black		1,025	255.8 (238.6)	NR (<0.001)
				Chronic MSK pain - Hispanic		913	253.4 (220.3)	NR (<0.001)
				Chronic MSK pain - Non-Hispanic White		6,240	297.2 (242.6)	reference
				Chronic MSK pain - Other		462	254.9 (215.6)	NR (0.001)
		Educational Materials Utilized, total	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	2.3 (4.4)	NR
				Chronic MSK pain - Asian		910	1.6 (3.1)	NR
				Chronic MSK pain - Black		1,025	2.4 (4.6)	NR
				Chronic MSK pain - Hispanic		913	2.1 (4.1)	NR
				Chronic MSK pain - Non-Hispanic White		6,240	2.5 (4.6)	NR
				Chronic MSK pain - Other		462	2.1 (3.7)	NR
		Interactions with PT, total	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	13.1 (13.1)	NR
				Chronic MSK pain - Asian		910	12.9 (12.3)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Black		1,025	11.2 (12.0)	NR (<0.001)
				Chronic MSK pain - Hispanic		913	12.6 (12.3)	NR
				Chronic MSK pain - Non-Hispanic White		6,240	14.3 (13.5)	reference
				Chronic MSK pain - Other		462	13.3 (13.6)	NR
Scheer 2023b	ITT	Exercise sessions, per week	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	2.8 (1.2)	NR
		Exercise sessions, total				5,749	29.53 (21.2)	NR
		Training time, total minutes				5,749	364.3 (263.6)	NR
		Text messages exchanged, total				5,749	18.6 (25.3)	NR
		Educational Materials Utilized, total				5,749	3.6 (6.7)	NR
Costa 2022b	ITT	Exercise sessions, total	12 weeks	Acute low back pain	Sword Health	406	33.2 (29.2)	NR
		Exercise sessions, per week				406	2.7 (1.3)	NR
		Training time, total minutes				406	1345.5 (289.7)	NR
		Educational Materials Utilized, total				406	4.3 (6.9)	NR
Costa 2022c	C	Exercise sessions, per week	12 weeks	Acute MSK pain	Sword Health	343	3.2 (1.29)	NR

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
		Educational Materials Utilized, weekly				300	1.5 (0.9)	NR
Janela 2022a	ITT	Exercise sessions, per week	12 weeks	Chronic shoulder pain	Sword Health	296	2.7 (1.5)	NR
		Training time, total minutes				296	763.7 (546.9)	NR
		Educational Materials Utilized, total				296	10.4 (10.2)	NR
Janela 2022b	ITT	Exercise sessions, per week	12 weeks	Chronic Hip Pain	Sword Health	534	2.9 (1.1)	NR
		Exercise sessions, total				534	30.4 (27.8)	NR
		Educational Materials Utilized, total				534	5.3 (7.5)	NR
		Interactions with PT, total [5]				537	11.3 (13.3)	NR
Scheer 2023a	ITT	Exercise sessions, per week	4-12 weeks	Acute & chronic MSK pain - Urban	Sword Health	8,809	2.76 (1.14)	NR (0.11)
				Acute & chronic MSK pain - Rural		1,183	2.78 (1.12)	reference
		Training time, total minutes	4-12 weeks	Acute & chronic MSK pain - Urban		8,809	472.02 (485.56)	NR (0.48)
				Acute & chronic MSK pain - Rural		1,183	482.54 (485.96)	reference
		Educational Materials Utilized, total	4-12 weeks	Acute & chronic MSK pain - Urban		8,809	2.72 (5.27)	NR (<0.001)
				Acute & chronic MSK pain - Rural		1,183	3.44 (6.18)	reference

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
		Interactions with PT, total	4-12 weeks	Acute & chronic MSK pain - Urban		8,809	11.79 (12.54)	NR (0.14)
				Acute & chronic MSK pain - Rural		1,183	12.37 (13.9)	reference
VORI HEALTH								
Woznica 2023	ITT	Exercise sessions, total	81 days	Acute & chronic low back pain	Vori Health	36	10.3 (5.9)	NR
OTHER								
Werneke 2022	C	Exercise sessions, total	NR	Acute & chronic low back pain - No TR	Control	86,104	NR	reference
				Acute & chronic low back pain - Any TR	Telerehabilitation	5,013	12.2	-1.0 (<0.001)
				Acute & chronic low back pain - Few TR		2,697	13.3	-0.7 (0.005)
				Acute & chronic low back pain - Most TR		983	12.6	-0.6 (0.089)
				Acute & chronic low back pain - All TR		1,333	9.7	-1.3 (<0.001)
Delgado 2023	ITT	Exercise sessions, total	12 weeks	Chronic MSK pain	Simple Therapy	3,109	median 5 (IQR 3-15)	NR
Fritz 2022	ITT	Exercise sessions, total	8 weeks	Chronic low back pain	Tele-health	88 [4]	4.5 (2.4)	NR

Key: CBT – cognitive behavioral therapy, Gen – generation, IQR – interquartile ratio, ITT – Intention-to-treat, C - Completers, NR – not reported, OR – odds ratio, PT – physical therapist, SD – standard deviation, SDI – social deprivation index, TR - telerehabilitation

1. Number of follow-up visits. 2. less than high school diploma, high school diploma, and some college. 3. bachelor's or graduate degree. 4. Patients that initiated telehealth PT. 5. Measured in days.

Appendix L-5: Satisfaction in Interventional Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD)	Between Group Difference Mean (P-value)
SWORD HEALTH								
Cui 2023	ITT	NRS (Scale 0-10)	8 weeks	Chronic low back pain	Sword Health	70	8.4 (2.0)	NR (0.837)
					Control	70	8.4 (2.6)	reference
Pak 2023	ITT	NRS (Scale 0-10)	8 weeks	Chronic shoulder pain	Sword Health	41	median 8 (IQR 5)	NR (<0.001)
					Control	41	median 10 (IQR 1)	reference

Key: IQR – interquartile range, ITT – intention to treat, NRS – numeric rating scale, NR – not reported
1. Pain duration not specified.

Appendix L-6: Satisfaction in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD) or n (%)	Between Group Difference Mean (P-value)
HINGE HEALTH								
Bailey 2020	ITT	NRS (Scale 0-10)	12 weeks	Chronic MSK pain	Hinge Health	10,264	8.97	NR
Smittenaar 2017	ITT	NRS (Scale 0-10)	12 weeks	Chronic knee pain	Hinge Health	41	NR	NR
			6 months			41	NR	NR
OMADA HEALTH								
Beresford 2022a	C	NRS (Scale 0-10)	NR	Acute & chronic MSK pain	Omada Health	814	9.3 (1.5)	NR
SWORD HEALTH								
Areias 2023a	ITT	NRS (Scale 0-10)	12 weeks	Chronic MSK pain - Young adults (≤44 years old)	Sword Health	4,629	8.5 (1.8)	reference
				Chronic MSK pain - Middle-aged adults (45-64 years old)		6,726	8.8 (1.7)	NR (<0.001)
				Chronic MSK pain - Older adults (≥65 years old)		727	8.7 (1.9)	NR (<0.001)
				Chronic MSK pain -Older adults (≥65 years old) with lower education levels [2]		NR	8.7 (1.8)	reference
				Chronic MSK pain -Older adults (≥65 years old) with higher education levels [3]		NR	8.9 (1.7)	NR (0.25)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD) or n (%)	Between Group Difference Mean (P-value)
Areias 2023b	ITT	NRS (Scale 0-10)	12 weeks	Chronic low back pain	Sword Health	560	8.8 (1.6)	NR
Areias 2023c	ITT	NRS (Scale 0-10)	4-12 weeks	Chronic MSK pain - Overall	Sword Health	12,062	8.9 (1.4)	NR
				Chronic MSK pain - SDI 0-20		3,666	8.9 (1.4)	NR
				Chronic MSK pain - SDI 20-40		2,903	8.9 (1.5)	NR
				Chronic MSK pain - SDI 40-60		2,398	8.9 (1.5)	NR
				Chronic MSK pain - SDI 60-80		1,874	9.0 (1.5)	NR
				Chronic MSK pain - SDI 80-100		1,221	9.0 (1.4)	NR
Costa 2022a	ITT	NRS (Scale 0-10)	8-12 Weeks	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6,137	8.6 (1.72)	reference
				Acute & chronic MSK pain - PHQ-9, score 5-10		1,158	8.5 (1.77)	NR (not significant)
				Acute & chronic MSK pain - PHQ-9, score ≥10		490	8.6 (1.98)	NR (not significant)
Scheer 2022	ITT	NRS (Scale 0-10)	12 weeks	Chronic MSK pain - Overall	Sword Health	9,550	9.0 (1.5)	p<0.001
				Chronic MSK pain - Asian		910	8.8 (1.4)	p<0.001
				Chronic MSK pain - Black		1,025	9.3 (1.1)	p<0.001
				Chronic MSK pain - Hispanic		913	9.3 (1.3)	p<0.001

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD) or n (%)	Between Group Difference Mean (P-value)
				Chronic MSK pain - Non-Hispanic White		6,240	8.9 (1.5)	reference
				Chronic MSK pain - Other		462	8.8 (1.7)	p<0.001
Scheer 2023b	ITT	NRS (Scale 0-10)	4-12 weeks	Acute & chronic MSK pain	Sword Health	5,749	NR	NR
Costa 2022b	ITT	NRS (Scale 0-10)	12 weeks	Acute low back pain	Sword Health	406	8.7 (1.4) NR [3]	NR
Costa 2022c	C	NRS (Scale 0-10)	12 weeks	Acute MSK pain	Sword Health	300	8.7 (1.26)	NR
Janela 2022a	ITT	NRS (Scale 0-10)	12 weeks	Chronic shoulder pain	Sword Health	296	8.7 (1.6)	NR
Janela 2022b	ITT	NRS (Scale 0-10)	12	Chronic Hip Pain	Sword Health	534	8.7 (1.6)	NR
Scheer 2023a	ITT	NRS (Scale 0-10)	4-12 weeks	Acute & chronic MSK pain - Urban	Sword Health	8,809	8.6 (1.7)	NR (0.95)
				Acute & chronic MSK pain - Rural		1,183	8.6 (1.8)	reference
OTHER								
Werneke 2022	C	Very satisfied	NR	Acute & chronic low back pain - No TR	Control	86,104	NR	reference
				Acute & chronic low back pain - Any TR	Telere-habilitation	5,013	NR (81.7%)	-4.0% (<0.001)
				Acute & chronic low back pain - Few TR		2,697	NR (81.2%)	-4.4% (<0.001)
				Acute & chronic low back pain - Most TR		983	NR (81.5%)	-5.0% (0.003)

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up Mean (SD) or n (%)	Between Group Difference Mean (P-value)
				Acute & chronic low back pain - All TR		1,333	NR (82.8%)	-2.1% (0.136)
Fritz 2022	C	Satisfied with program	10 weeks	Chronic low back pain	Telehealth	77	NR (76.3%)	NR

Key: ITT – Intention-to-treat, C - Completers, NR – not reported, NRS – numeric rating scale, SD – standard deviation, SDI – social deprivation index, TR – telerehabilitation
1. less than high school diploma, high school diploma, and some college. 2. bachelor's or graduate degree. 3. 65% (251/385) of participants reporting a 9 or 10, 29% (113/385) reporting 7 or 8 and 6% (21/385) reporting 6 or less.

Appendix L-7: Harms in Prospective Interventional Trials

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up N (%)	Between Group Difference Mean (P-value)
KAIA HEALTH								
Toelle 2019	C	Adverse events	12 weeks	Acute & chronic low back pain	Kaia Health	42	1 (NR)	NR
LIMBER HEALTH								
Gruner 2021	C	Adverse events	8 weeks	Acute & chronic knee pain	Limber Health	24	0 (0)	NR
					Control	26	0 (0)	NR
SWORD HEALTH								
Cui 2023	ITT	Adverse events	8 weeks	Chronic low back pain	Sword Health	70	NR (17.5)	NR (0.277)
					Control	70	NR (10.5)	reference
		Serious Adverse Events	8 weeks	Chronic low back pain	Sword Health	70	0 (0)	NR
					Control	70	0 (0)	NR
Pak 2023	ITT	Adverse events	8 weeks	Chronic shoulder pain	Sword Health	41	0 (0)	NR
					Control	41	0 (0)	NR

1. Pain duration not specified.
Key: ITT – Intention-to-treat, C - Completers, NR – not reported

Appendix L-8: Harms in Observational Studies

Citation	Analysis	Scale	Duration	Patient Population	Arm	n	At Follow-up N (%)	Between Group Difference Mean (P-value)
SWORD HEALTH								
Areias 2023b	ITT	Serious Adverse Events	12 weeks	Chronic low back pain	Sword Health	560	0 (0)	NR
Janela 2022b	ITT	Serious Adverse Events	12 weeks	Chronic Hip Pain	Sword Health	534	0 (0)	NR

Key: ITT – Intention-to-treat, C - Completers, NR – not reported

Appendix M – Baseline Patient Characteristics in SLR

Appendix M-1: Baseline Characteristics in Interventional Trials

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
HINGE HEALTH										
Mecklenburg 2018	Chronic knee pain	Hinge Health	101	46 (12)	43%	NR	27 (5)	NR	NR	NR
		Control	54	47 (12)	26%	NR	28 (4)	NR	NR	NR
Shebib 2019	Chronic low back pain	Hinge Health	113	43 (11)	37%	NR	26 (5)	NR	NR	NR
		Control	64	43 (12)	48%	NR	26 (4)	NR	NR	NR
KAIA HEALTH										
Toelle 2019	Acute & chronic low back pain	Kaia Health	48	41 (10.6)	72.9%	NR	24.4 (3.31)	NR	NR	NR
		Control	46	43 (11.0)	67.4%	NR	25.4 (4.6)	NR	NR	NR
Priebe 2020	Acute low back pain	Kaia Health [1]	933	42.0 (12.4)	65%	NR	NR	NR	NR	87%
		Control	312	37.0 (12.6)	64%	NR	NR	NR	NR	87%
LIMBER HEALTH										
Gruner 2021	Acute & chronic knee pain	Limber Health	24	58.5 (13.7)	50.0%	NR	26.7 (3.7)	NR	NR	NR
		Control	26	55.9 (13.3)	34.6%	NR	27.5 (4.4)	NR	NR	NR
RECOVERYONE										
Bray 2021	Low back pain	RecoveryOne		NR	NR	NR	NR	NR	NR	NR
SWORD HEALTH										

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
Cui 2023	Chronic low back pain	Sword Health	70	50.5 (22.0) [2]	65.7%	Asian: 15.7% Black: 38.6% Hispanic: 4.3% White: 40.0% Other: 1.4% [3]	28.26 (9.29) [2]	NR	Some High School: 2.9% High School: 10.0% Some College: 24.3% Bachelor's: 24.3% Master's: 38.6% [4]	68.6%
		Control	70	54.5 (20.0) [2]	70.0%	Asian: 8.6% Black: 48.6% Hispanic: 2.9% White: 32.9% Other: 7.1% [5]	28.30 (8.22) [2]	NR	Some High School: 2.9% High School: 7.1% Some College: 27.1% Bachelor's: 20.0% Master's: 40.0% [4]	65.7%
Pak 2023	Chronic shoulder pain	Sword Health	41	49.7 (12.6)	58.5%	Asian: 34.1% Black: 2.4% Hispanic: 7.3% White: 41.5% Other: 14.6% [3]	24.4 (5) [2]	NR	NR	68.3%
		Control	41	50.8 (12.9)	46.3%	Asian: 22% Black: 4.9% Hispanic: 4.9% White: 58.5% Other: 9.8%	25.6 (7) [2]	NR	NR	68.3%
OTHER										

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
Lentz 2023	Chronic low back pain	AIM-Back SCP	396	52.3 (15.5)	13.1%	Asian: NR Black: 36.1% Hispanic: 3.2% White: 62.5% Other: 1.4% [6]	NR	NR	NR	NR
Bates 2023[9]	Low back pain - Control	Tonal Systems, Inc.	9	37.2 (13.7)	66.7%	Asian: 0% Black: 0% Hispanic: 0% White: 100% Other: NR [7]	28.4 (8.5)	NR	NR	NR
	Low back pain - Training		13	37.8 (11.5)	76.9%	Asian: 0% Black: 7.7% Hispanic: 0% White: 84.6% Other: NR [7]	28.6 (7.2)	NR	NR	NR
	Low back pain - Clinical		27	40.3 (12.4)	66.7%	Asian: 3.7% Black: 0% Hispanic: 3.7% White: 92.6% Other: NR [7]	30.7 (8.2)	NR	NR	NR
	Low back pain – Combined Treatment		20	46.3 (10.2)	55%	Asian: 5% Black: 0% Hispanic: 0% White: 95% Other: NR [7]	28.6 (5.6)	NR	NR	NR

Key: BMI – body mass index, NR – not reported, SD – standard deviation.
1. Participants were granted access to the Kaia back pain application and were instructed by their GP to use the app and complete the educational program, physiotherapy and mindfulness as frequently as possible. 2. Median (IQR). 3. Asian or Pacific Islander, Black or African American, Hispanic or Latino, White or Caucasian. 4. Master's -- calculated; includes individuals with some post-graduate or professional schooling. 5. Calculated. 6. Black or African American, Hispanic or Latino, Other (American Indian, Alaska Native, Native Hawaiian, or other Pacific Islander). 7. Caucasian. 8. Pain duration not specified. 9. Control arm: no treatment; Training arm: supervised artificial-intelligence-guided core-focused resistance training; Clinical arm: clinical care; Combined Treatment: both clinical care and artificial-intelligence-guided training.

Appendix M-2: Baseline Characteristics in Observational Studies

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
HINGE HEALTH										
Hong 2022	Acute MSK pain	Hinge Health	75	46.8 (11.1)	NR	NR	NR	NR	NR	NR
		Control	96	42.2 (11.9)	NR	NR	NR	NR	NR	NR
Wang 2022a	Acute MSK pain	Hinge Health	262	44.4 (11.3)	NR	NR	NR	NR	NR	NR
		Control	675	44.0 (12.1)	NR	NR	NR	NR	NR	NR
Wang 2022b	Chronic MSK pain	Hinge Health	2720	49.3 (12.1)	62.7%	NR	NR	NR	NR	NR
		Control	1650	45.8 (12.4)	59.1%	NR	NR	NR	NR	NR
Wang 2023	Back pain cohort	Hinge Health	2120	NR	40.0%	NR	NR	NR	NR	NR
		Control	2120	NR	38.2%	NR	NR	NR	NR	NR
	Knee pain cohort	Hinge Health	799	NR	53.2%	NR	NR	NR	NR	NR
		Control	799	NR	52.8%	NR	NR	NR	NR	NR
	Shoulder pain cohort	Hinge Health	282	NR	40.4%	NR	NR	NR	NR	NR
		Control	282	NR	38.7%	NR	NR	NR	NR	NR
	Hip pain cohort	Hinge Health	287	NR	62.0%	NR	NR	NR	NR	NR
		Control	287	NR	62.0%	NR	NR	NR	NR	NR
	Neck pain cohort	Hinge Health	707	NR	54.5%	NR	NR	NR	NR	NR

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
		Control	707	NR	52.3%	NR	NR	NR	NR	NR
Bailey 2020	Chronic MSK pain	Hinge Health	10264	43.6 (11.1)	50.0%	NR	30.25 (7.42)	NR	NR	NR
	Back pain cohort	Hinge Health	6468	42.6 (10.9)	NR	NR	29.76 (7.11)	NR	NR	NR
	Knee pain cohort	Hinge Health	3796	45.3 (11.3)	NR	NR	31.09 (7.84)	NR	NR	NR
Wang 2021	Chronic MSK pain - Gen Z or millennial	Hinge Health	13535	31.3 (4.3)	50.4%	NR	NR	NR	NR	NR
	Chronic MSK pain - Gen X	Hinge Health	16982	46.2 (4.7)	54.1%	NR	NR	NR	NR	NR
	Chronic MSK pain - Working age baby boomer	Hinge Health	9262	58.7 (2.9)	54.0%	NR	NR	NR	NR	NR
	Chronic MSK pain - Retiree age baby boomer and silent generation	Hinge Health	1462	68.6 (4.2)	44.7%	NR	NR	NR	NR	NR
Smittenaar 2017	Chronic knee pain	Hinge Health	41	52 (9)	78%	NR	29 (7)	NR	NR	100%
OMADA HEALTH										
Beresford 2022a*	Acute & chronic MSK pain	Omada Health	814	40.9 (11.9)	47.5%	NR	NR	NR	NR	NR
SWORD HEALTH										
Areias 2022	Chronic MSK pain	Sword Health	310	50.5 (11.3)	53.9%	NR	29.1 (6.6)	NR	NR	NR

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
		Control	150	46.5 (11.1)	54.7%	NR	32.4 (8.5)	NR	NR	NR
Areias 2023a	Young adults (≤44 years old)	Sword Health	4629	35.9 (5.7)	55.9%	Asian: 9.9% Black: 7.4% Hispanic: 9.6% White: 44.9% Other: 28.2% [1]	28.4 (6.7)	Urban: 90.4% Rural: 9.6%	Some High School: 0.5% High School: 5.7% Some College: 18% Bachelor's: 36.6% Master's: 22.5%	92.4%
	Middle-aged adults (45-64 years old)	Sword Health	6726	54.5 (5.6)	59.5%	Asian: 6.8% Black: 8.3% Hispanic: 6.9% White: 50.3% Other: 27.7% [1]	29.7 (6.7)	Urban: 88% Rural: 12%	Some High School: 0.7% High School: 7.4% Some College: 22.6% Bachelor's: 32.5% Master's: 20.1%	91.3%
	Older adults (≥65 years old)	Sword Health	727	67.3 (3.1)	48.4%	Asian: 4.4% Black: 4.8% Hispanic: 4% White: 53.8% Other: 33% [1]	29 (5.8)	Urban: 86.8% Rural: 13.2%	Some High School: 0.7% High School: 9.4% Some College: 21.3% Bachelor's: 28.6% Master's: 25.2%	79.4%
Areias 2023b	Chronic low back pain	Sword Health	560	47.3 (10.4)	51.6%	NR	30 (6.8)	NR	NR	86.7%
Areias 2023c	Chronic MSK pain - SDI 0-20	Sword Health	3666	49.3 (11.0)	54.5%	Asian: 9.3% Black: 3.9% Hispanic: 4.7% White: 52.1% Other: 30.1% [1]	28.5 (6.2)	Urban: 95.3% Rural: 4.7%	Some High School: 0.4% High School: 4.8% Some College: 15.9%	90.7%

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
									Bachelor's: 37.9% Master's: 23.7%	
	Chronic MSK pain - SDI 20-40	Sword Health	2903	48.3 (11.5)	59.9%	Asian: 8.7% Black: 5.8% Hispanic: 6.1% White: 52.8% Other: 26.7% [1]	28.9 (6.7)	Urban: 88.3% Rural: 11.7%	Some High School: 0.6% High School: 6.2% Some College: 20.8% Bachelor's: 34.8% Master's: 21.7%	91.5%
	Chronic MSK pain - SDI 40-60	Sword Health	2398	47.6 (11.8)	57.8%	Asian: 6.2% Black: 7.1% Hispanic: 8.6% White: 49.5% Other: 28.5% [1]	29.4 (6.9)	Urban: 83.1% Rural: 16.9%	Some High School: 0.4% High School: 8.1% Some College: 23.4% Bachelor's: 31.3% Master's: 20.4%	89.7%
	Chronic MSK pain - SDI 60-80	Sword Health	1874	47.8 (11.7)	57.3%	Asian: 7.6% Black: 1.1% Hispanic: 10.2% White: 43.6% Other: 27.5% [1]	29.8 (6.7)	Urban: 82.8% Rural: 17.2%	Some High School: 1.1% High School: 8.4% Some College: 24.3% Bachelor's: 29.3% Master's: 20.3%	91.8%

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
	Chronic MSK pain - SDI 80-100	Sword Health	1221	45.7 (11.5)	60.7%	Asian: 5.0% Black: 20.3% Hispanic: 15.4% White: 33.1% Other: 26.2% [1]	30.1 (7.0)	Urban: 91.2% Rural: 8.8%	Some High School: 1.2% High School: 10.4% Some College: 24.8% Bachelor's: 31.1% Master's: 16.5%	91.6%
Costa 2022a	Acute & chronic MSK pain - PHQ-9 score <5	Sword Health	6137	51.4 (12.7)	53.4%	NR	28.8 (6.3)	NR	NR	85.7%
	Acute & chronic MSK pain - PHQ-9 score 5-10	Sword Health	1158	50 (13.4)	60.6%	NR	30.6 (7.1)	NR	NR	85.7%
	Acute & chronic MSK pain - PHQ-9 score ≥10	Sword Health	490	48.7 (13.4)	60.6%	NR	32.9 (7.9)	NR	NR	74.3%
Janela 2023	Acute & chronic MSK pain - FABQ-PA scores ≥15	Sword Health	520	50.4 (10.6)	52.3%	NR	27.7 (5.6)	NR	NR	92.5%
Scheer 2022	Chronic MSK pain - Overall	Sword Health	9550	49.4 (12.9)	58.5%	Asian: 9.5% Black: 10.7% Hispanic: 9.6% White: 65.3% Other: 4.8%	29.2 (6.7)	NR	Some High School: 0.6% High School: 10.4% Some College: 27.1% Bachelor's: 33.9% Master's: 23.0%	NR

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
	Chronic MSK pain - Asian	Sword Health	910	44.4 (11.2)	53.3%	Asian: 100% Black: 0% Hispanic: 0% White: 0% Other: 0%	25.3 (4.4)	NR	Some High School: 0.2% High School: 2.7% Some College: 8.7% Bachelor's: 46.4% Master's: 38.0%	NR
	Chronic MSK pain - Black	Sword Health	1025	50.4 (12.4)	69.6%	Asian: 0% Black: 100% Hispanic: 0% White: 0% Other: 0%	31.7 (6.9)	NR	Some High School: 1.0% High School: 13.5% Some College: 38.8% Bachelor's: 25.4% Master's: 17.5%	NR
	Chronic MSK pain - Hispanic	Sword Health	913	45.8 (11.4)	54.5%	Asian: 0% Black: 0% Hispanic: 100% White: 0% Other: 0%	29.8 (6.4)	NR	Some High School: 1.4% High School: 17.5% Some College: 30.6% Bachelor's: 29.6% Master's: 15.8%	NR
	Chronic MSK pain - Non-Hispanic White	Sword Health	6240	50.7 (13.2)	58.4%	Asian: 0% Black: 0% Hispanic: 0% White: 100% Other: 0%	29.4 (6.7)	NR	Some High School: 0.6% High School: 10.1% Some College: 27.7% Bachelor's: 34.6% Master's: 22.7%	NR

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
	Chronic MSK pain - Other	Sword Health	462	46.1 (12.5)	54.3%	Asian: 0% Black: 0% Hispanic: 0% White: 0% Other: 100%	28.3 (6.2)	NR	Some High School: 0.4% High School: 8.9% Some College: 21.6% Bachelor's: 27.9% Master's: 23.2%	NR
Scheer 2023b	Acute & chronic MSK pain	Sword Health	5749	50.8 (12.7)	56.7%	NR	29.1 (6.5)	NR	NR	81.9%
Costa 2022b	Acute low back pain	Sword Health	406	46.6 (11.8)	46.8%	NR	28.3 (6.2)	NR	NR	94.8%
Costa 2022c	Acute MSK pain	Sword Health	343 [4]	51.1 (11.4)	59.8%	NR	28.8 (6.55)	NR	NR	88.3%
		Sword Health	300 [5]	51.3 (11.3)	60.3%	NR	28.7 (6.5)	NR	NR	87%
Janela 2022a	Chronic Shoulder pain	Sword Health	296	50.9 (11.6)	52.7%	NR	28.7 (6.6)	NR	NR	92.9%
Janela 2022b	Chronic Hip Pain	Sword Health	534	50.2 (11.3)	363 (68.0)	NR	29.1 (6.4)	NR	NR	89.9%
Scheer 2023a	Acute & chronic MSK pain - Overall	Sword Health	9,992	48.6 (12.5)	55.1%	NR	29.18 (6.74)	NR	NR	NR
	Acute & chronic MSK pain - Urban	Sword Health	8,809	48.1 (12.4)	54.7%	NR	28.96 (6.6)	Urban: 100% Rural: 0%	NR	NR
	Acute & chronic MSK pain - Rural	Sword Health	1,183	51.9 (12.6)	57.8%	NR	30.83 (7.48)	Urban: 0% Rural: 100%	NR	NR
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Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
Woznica 2023	Acute & chronic low back pain	Vori Health	36	53.5 (15.3)	52.8%	NR	31.6 (8.4)	NR	NR	NR
OTHER										
Skolasky 2022	Chronic low back pain	DHT	31	42.2 (14.4)	71.0%	Asian: NR Black: 22.6% Hispanic: 13.3% White: 71.0% Other: 6.4% [1]	34.0 (11.6)	NR	Some High School: 6.5% High School: 41.9% Some College: NR Bachelor's: 51.6% Master's: NR	51.6%
Delgado 2023	Chronic MSK pain	Simple Therapy	3,109	48 (36-57)[6]	69%	NR	27 (24-31)[6]	NR	NR	NR
Werneke 2022	Acute & chronic low back pain - Overall	DHT	91117	55.1 (18.0)	58.2%	NR	NR	Urban: 99.2% Rural: 0.8% [2]	NR	NR
	Acute & chronic low back pain - No TR	Control	86104	55.3 (18.0)	58.0%	NR	NR	Urban: 99.2% Rural: 0.8% [2]	NR	NR
	Acute & chronic low back pain - Any TR	DHT	5013	51.5 (17.6)	61.2%	NR	NR	Urban: 99.4% Rural: 0.6% [2]	NR	NR
	Acute & chronic low back pain - Few TR	DHT	2697	50.4 (NR)	62.4%	NR	NR	Urban: 99.3% Rural: 0.7% [2]	NR	NR

Citation	Patient Population	Arm	n	Years of Age Mean (SD)	Female	Race/Ethnicity	BMI Mean (SD)	Geographic Location (urban or rural)	Education Level	Employment (part- or full-time)
	Acute & chronic low back pain - Most TR	DHT	983	52.4 (NR)	60.8%	NR	NR	Urban: 99.5% Rural: 0.5% [2]	NR	NR
	Acute & chronic low back pain - All TR	DHT	1333	53.2 (NR)	58.9%	NR	NR	Urban: 99.5% Rural: 0.5% [2]	NR	NR
Fritz 2022	Chronic low back pain	Telehealth	126	51.5 (14.7)	62.7%	Asian: NR Black: 24.6% Hispanic: 11.2% White: 68.3% Other: 7.1% [3]	32.7 (8.6)	NR	Some High School: 6.3% High School: 40.5% Some College: NR Bachelor's: 53.2% Master's: NR	51.6%

Key: BMI – body mass index, Gen – generation, NR – not reported, SD – standard deviation, TR - telerehabilitation
1. Other – Calculated. 2. Urban – Calculated. 3. Hispanic or Latino. 4. ITT population. 5. C. 6. Median (IQR). *Patient characteristics also pertain to Beresford 2022b.

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