Abstract

Introduction: People with long-term conditions or recovering from serious injuries can struggle to return to work (RTW). The evidence for occupational therapy (OT) supporting RTW is limited. We aimed to identify and explain how OT interventions work.

Methods: Systematic review. Seven databases were searched between 01/01/1980 and 15/06/2022. Studies measuring work-related outcomes among individuals receiving OT during absence from paid work were included. Multiple reviewers independently contributed to screening, quality appraisal and data extraction processes. Data were analysed as a narrative.

Results: Twenty studies with 3,866 participants were included;17 were assessed as high risk of bias. OT was inconsistently acknowledged affecting study identification and OT components were poorly described. Meta-analysis was unfeasible due to outcome heterogeneity. Individually tailored OT focused on RTW in musculoskeletal conditions indicated the most promising outcomes. Key intervention components included vocational assessment, goal setting, and self-management. Key mechanisms of action included early intervention, individualised support, and being responsive to needs.

Conclusion: Occupational therapists' contributions supporting RTW should be clearly attributed. Future effectiveness research should standardise the measurement of work outcomes to support meta-analysis. Developing a taxonomy for OT supporting RTW could facilitate comparisons across studies, highlighting occupational therapists' roles, and facilitating training and benefits to patients.

Keywords: Occupational Therapy; long-term health conditions; serious injury; return-to-work; vocational rehabilitation; systematic review.

Introduction

Supporting people who have long-term health conditions or sustain serious injuries in returning to work is a core Occupational Therapy (OT) business (Royal College of Occupational Therapists, 2020). Supporting people returning to work is a major responsibility for healthcare professionals in the United Kingdom (UK) and a key outcome of National Health Service (NHS) interventions (Department of Health, 2010). It is also important to the UK economy, and individuals' physical, mental, and financial well-being (Royal College of Occupational Therapists, 2018).

One-third of people admitted to hospital following serious injury do not return to work (RTW) within 12 months (David et al., 2022). Those that do, may suffer from physical and mental health problems, including pain, fatigue, anxiety, depression, and post-traumatic stress disorder (PTSD), which threaten work stability (Cancelliere et al., 2016; Kendrick et al., 2017; Vardon-Bounes et al., 2021; Vitturi et al., 2022) and increase health resource use. Each year, around 300,000 people with mental health conditions fall out of work in the UK, and to date, there is limited evidence on how best to support them (Carol Black, 2008; Department for Work and Pensions., 2016).

The effectiveness of OT interventions for supporting RTW following illness or injury remains unclear. A 2011 review only reported findings in favour of using OT as part of a multidisciplinary team; however, no meta-analysis was conducted, possibly due to study heterogeneity (Désiron et al., 2011). Since then, the development of reporting guidelines (e.g., CONSORT) may have led to improved quality of reporting.

Thus, there is a need to systematically review the contemporary evidence available on OT RTW interventions, to address the following research questions:

1. What RTW interventions are being delivered as part of OT to working-aged people with serious injuries or long-term physical/mental health conditions?
2. Are the OT interventions effective?
3. What are the components and mechanisms of action of OT interventions that facilitate RTW?

Methods

The protocol for this systematic review was registered on PROSPERO CRD42020211670.

Inclusion and exclusion criteria

Research articles were included if: (1) the study described an OT intervention including a work-related outcome. A wide range of OT interventions were included such as workplace interventions, vocational rehabilitation (VR) interventions, service coordination interventions, work hardening, and multi-component interventions. There were no limitations on the number, format, methods, intensity, or duration of treatments. RTW interventions could be delivered as a stand-alone OT intervention or as multi-disciplinary rehabilitation in different settings, including community-based services in the public, private and third sectors (e.g., charities, voluntary and community organisations); (2) the study (randomised controlled trials and cohort studies) included a comparator such as control or another non-OT active intervention; (3) The primary outcome of the intervention was work status, which we defined as relating to work disability i.e., sickness absence, total time loss and time until RTW, but also limitations in meeting work demands to stay at work. Work status could be expressed dichotomously for RTW (yes/no) or work status (working/not working); and (4) participants were adults (+16) in paid employment who were absent from work due to an injury or long-term physical or mental health condition.

Studies were excluded if (1) the intervention did not include an OT component; (2) the OT did not include a RTW outcome; and (3) studies included participants with congenital health conditions.

Literature search

The search strategy was constructed and piloted using Ovid Medline by the research team that included a librarian. The strategy was adapted to fit the requirements of each database. The databases (Ovid Medline, Ovid Embase, Ovid PsycINFO, Cochrane Library, ClinicalTrials.Gov, CINAHL and ProQuest Theses & Dissertations) were searched for studies published between 1/1/1980 and 15/06/2022. See appendix 1 for search strategy.

Seven reviewers conducted the selection process to increase the screening reliability. Records from the search were uploaded to Covidence systematic review software (Veritas Health Innovation, 2016) to manage the selection process. Duplicate studies were removed, and the titles and abstracts of each record were independently screened by two researchers. Discrepancies were resolved through discussion with a third reviewer. The full texts of all relevant studies were screened in the same way. Reference lists of included papers were reviewed to identify studies not found in the searches.

Data extraction and synthesis

A data extraction form was developed, piloted, and modified by the review team using Covidence (Veritas Health Innovation, 2016). Data on interventions were extracted using the template for intervention description and replication (TIDieR) checklist (Hoffmann et al., 2014) and the Rehabilitation Treatment Specification System (RTSS) (van Stan et al., 2019) to explain the intervention components and mechanisms of action. Data were extracted independently by two reviewers; any discrepancies were resolved through discussion with a third reviewer.

The following information was extracted from the studies: author, country, study type, inclusion criteria, participant's characteristics and intervention description following the TIDieR checklist (Hoffmann et al., 2014). The intervention description included a section reporting on the OT intervention. When occupational therapists deliver RTW support alone or in a team, this is often labelled as VR, which can be defined as, "a multi-professional evidence-based approach that is provided in different settings, services, and activities to working-age individuals with health-related impairments, limitations, or restrictions with work functioning, and whose primary aim is to optimize work participation" (Escorpizo et al., 2011). Drawing on previous work revealed whether a study's intervention could be identified as VR using existing descriptions (Cullen et al., 2018) and VR intervention terminology by Hart (2006) and Cullen (2018). A glossary of terms can be seen in appendix 2.

The data extraction form also included a section regarding the intervention outcomes. Our primary outcome was work status, which we defined as relating to work disability i.e., sickness absence, total time loss and time until RTW, but also limitations in meeting work demands to stay at work. This could be expressed dichotomously for RTW (yes/no) or work status (working/not working) at a time point within study groups. Continuous outcome measures included the number of hours at work, number and/or duration of sickness absences, total duration of sick leave over a given period, and recurrences of sick leave/work absence (by self-report or collected from organisational or system records measurements). RTW was assessed as the rate of RTW amongst a group after their allocation to RTW OT intervention or control conditions. Because work outcomes are usually reported in a multitude of ways, we used an existing framework by Wasiak (2007). We identified any work status outcome and categorised it using the framework that encompasses four phases: off

work, work reintegration, work maintenance and advancement. Secondary outcomes included all other outcomes reported such as functional ability, mood, and quality of life. Due to study and outcome heterogeneity, the results are presented as a narrative synthesis (Popay et al., 2006), which refers to the process of synthesising the identified studies using descriptions (a narrative) of the studies and findings, as opposed to statistical synthesis.

Assessment of methodological quality

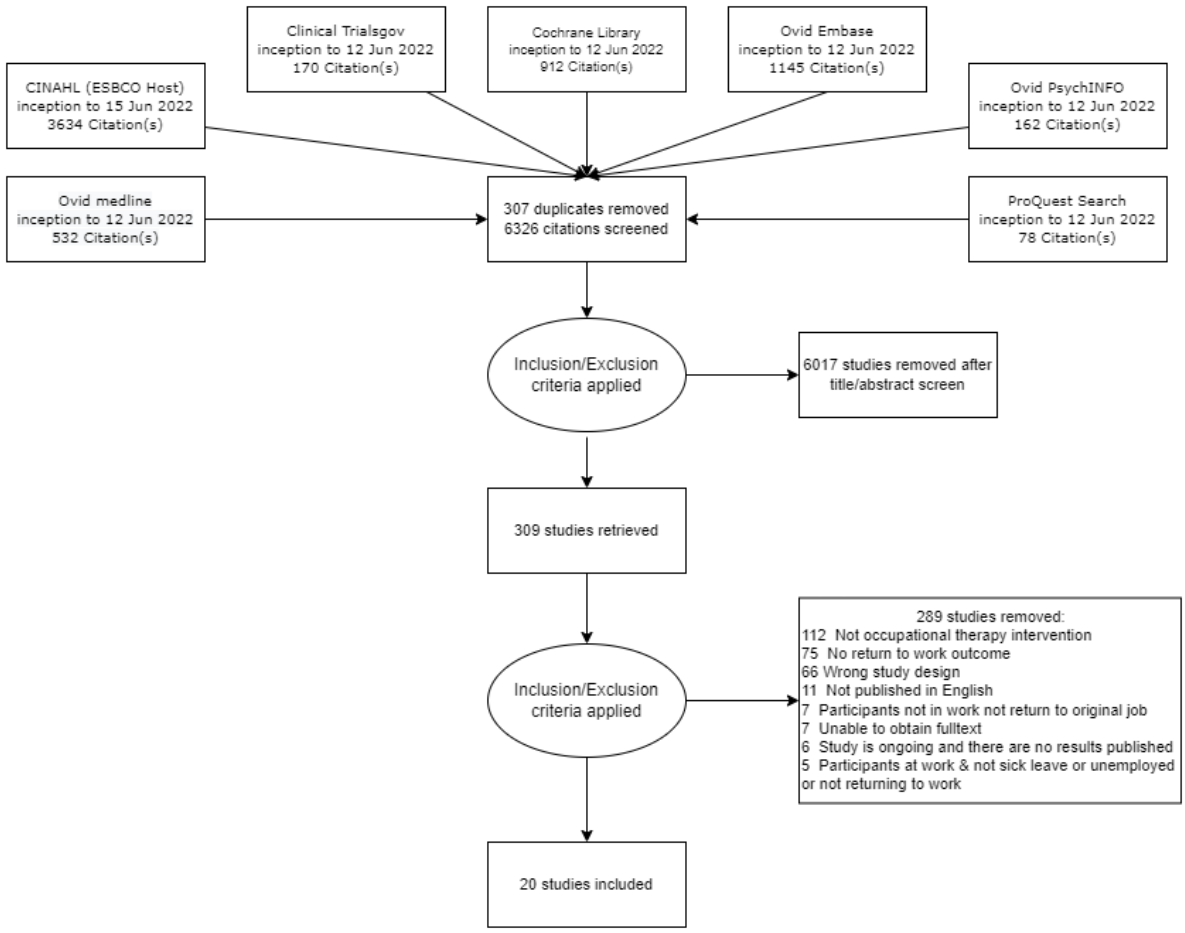
We assessed the risk of bias using the Cochrane tool from the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2011). This tool assesses six main domains of bias (performance bias, detection bias, attrition bias, reporting bias, and other biases) (Higgins et al., 2011). Each study was assessed by two independent reviewers; a third was consulted to resolve discrepancies.

Results

Study selection

In total 6,633 studies were identified, and 307 were removed as duplicates, resulting in 6,326 studies screened by title and abstract. We excluded 6,017 based on the title and abstract and assessed the full text of 309 studies for eligibility. Of these 289 studies were excluded. The reasons for exclusion were: not OT intervention (n=112), no return to work outcome (n=75), excluded study design (n=66), not in English (n=11), participants were not in work or did not return to their original job (n=7), unable to obtain full text (n=7), ongoing studies (n=6), or participants were at work, unemployed or not returning to work (n=5). Twenty studies were included in the review. The PRISMA 2020 flowchart (Page et al., 2021) depicts the study selection process (Figure 1).

Figure 1 PRISMA 2020 Flowchart



Study characteristics

Among the 20 included studies (Table 1), there were 18 were randomised controlled trials (RCTs), one cohort study, and one non-randomised study spanning 24 years (1995-2019) of literature from 10 countries including Sweden n=4 (Berglund et al., 2018; Carlsson et al., 2013; Eklund et al., 2013; Johansson et al., 1998), France n=1 (Jousset et al., 2004), Netherlands n=4 (Hees et al., 2013; Lambeek et al., 2010; Schene et al., 2007; van Vilsteren et al., 2017), Denmark n=3 (Bendix et al., 1995, 2000; Stapelfeldt et al., 2011), Canada n=2 (Park et al., 2018; Sullivan et al., 2006), UK n=2 (Hammond et al., 2017; Macedo et al., 2009), USA n=1 (Keysor et al., 2018), Switzerland n=1 (Kool et al., 2007), Germany n=1 (Fauser et al., 2019), and Australia n=1 (Wu et al., 2017). See appendix 3 for theories underlying the development of the interventions.

1 *Table 1 Summary of studies included.*

First Author, Year of Publication, Country, and Study design	Type of intervention, target period, and Health condition	Participants total (intervention arm (females)) & inclusion criteria	Staffing & Intervention attributes	Components (*Delivered by occupational therapists*)	Control Group	Primary and secondary outcomes
Long-term physical health						
Bendix 1995 Denmark RCT	Health-Focused Intervention MDT Early (1-6 m) LBP	N=132 (40 (n=30)) • >6 months of disabling low back pain. • Risk of job loss. • Aged 18-59 • Able to read and write in Danish	OT, PT, psychologist 6-wks (3-wks, 39h/wk; 3-wks 1-day/wk) In person: individual, group Clinic	• Vocational assessment • Vocational counselling/education • Work preparation • ***Work hardening*** • Behavioural/interpersonal interventions • Self-responsibility and self-management • Graded activity/exercise • Therapeutic recreation	Control 1: Active physical training Control 2: Psychological pain management and active physical training	4m follow-up Sick leave (days) Back, leg pain Perception of disability
Bendix 2000 Denmark	Health Focused Intervention MDT	N=138 (64 (n=39)) • Person in precarious work situation because of low back pain	OT, PT, psychologist 6-wks (3-wks, 39h/wk; 3-wks 1-day/wk)	• Vocational assessment • Vocational counselling/education • Work preparation • ***Work hardening*** • Behavioural/interpersonal interventions	Outpatient Physical training	12m follow-up Sick leave (days) Back, leg pain

RCT	Target period unclear LBP		In person: individual, group Clinic	• Self-responsibility and self-management • Graded activity/exercise • Therapeutic recreation		
Johansson 1998 Sweden RC Study	Multi-domain Intervention MDT Long-term (12+m) Chronic musculoskeletal pain	N=42 (21 (n=36)) • Chronic musculoskeletal pain • No further medical or surgical treatment appropriate for pain • No psychotic illness present	OT, clinical psychologist, PT, physical education teacher, vocational counsellor, physician, nurse 4wk: 5d/wk. 2m later + 2 booster sessions + ad hoc sessions thereafter. In person; individual, group Inpatient ward	• Goal setting • RTW planning and coordination • Work hardening • Ergonomics • Self-responsibility and self-management • Graded activity/exercise	Waiting list control	1m, 2m, 12m follow-up Sick leave Activity levels Catastrophising and pain behaviours
Jousset 2004 France RCT	Health Focused Intervention Unidisciplinary Long-term (12+m) LBP	N=86 (44 (n=13)) • Aged 18-50 • Living within three counties of the west of France • Engaged in a non-limited work contract • Risk of job loss by chronic LBP	OT, PT 5-wks In person, groups Clinic	• Physical/ Occupational therapy • Work hardening	Active individual therapy (3h/ week)	6m follow-up Sick leave (days) Pain QoL Functional status Mood

		• LBP not relieved by medical or surgical interventions				
Kool 2007 Switzerland RCT	Health-focussed intervention MDT Target period unclear Chronic low back and leg pain	N=174 (87 (n=18)) • Aged 20-55 • Primary diagnosis of non-acute LBP • >6 weeks sick leave in the last 6 months	OT, rheumatologist, PT, sport therapist, social worker, nurse, psychologist 3-wks; 4h/d, 6d/wk In person: individual Clinic	• Vocational assessment • Job analysis • Work hardening • Self-responsibility and self-management • Graded activity/exercise	Pain centred treatment (primary goal pain reduction)	3 & 12m follow-up Workdays Disability compensation Self-efficacy Strength Pain Mobility
Lambeek 2010 Netherlands RCT	Multi-domain intervention MDT Early (1-6 m) LBP	N=134 (66 (n=29)) • Aged 18-65 • LBP for more than 12 wks • Paid employment at least 8 h/wk • Absent/ partially absent from work	OT, OHP, medical specialist, PT 3m In person: individual + group Clinic, workplace	• Vocational assessment • ***Job analysis*** • Case management • RTW planning and coordination • Work hardening • Graded exercise • ***Ergonomics*** • Emotional/adjustment interventions	Usual care – from specialist occupational physician, general practitioner, and/or allied health professionals.	3, 6, 9, & 12m follow-ups Days to sustainable RTW Sick leave Functional status Pain intensity

Stapelfeldt 2011 Denmark RCT	Case and Service Coordination MDT Early (1-6 m) LBP	N=351 (176 (n=95)) • Age 16 to 60 • Partially or fully sick-listed from work for 4-12 wks because of LBP	Case manager [OT, social medicine specialist, social worker], Physician, PT Duration/frequency unclear In person: individual Clinic	• Vocational assessment • Goal setting • Vocational counselling/education • Case management/ advocacy • RTW planning and coordination • Emotional/adjustment interventions • Self-responsibility and self-management	Brief Clinical Intervention – advice, physical exercise with physiotherapy follow up after 2wks.	12m follow-up Sickness absence Time to RTW *Sub-group analysis of group with low and high job satisfaction & job control*
Cancer						
Fauser 2019 Germany Cluster RCT	Multidomain Intervention MDT Target period unclear Cancer	N=484 (229 (n=163)) • Aged 18-60 • Completed initial cancer treatment • No active disease • Risk of not returning to work • Employability for at least 3 hours a day	OT, psychologist, physician, PT, social worker 25d: 1h assessment, 6h+4h+3h intervention In person; individual, group Inpatient ward, clinic classroom	• ***Vocational assessment*** • ***Job analysis*** • ***Goal setting*** • Vocational counselling/education • Case management/advocacy • RTW planning and coordination • ***Work hardening*** • Workplace adjustments • Ergonomics • Cognitive remediation • Self-responsibility and self-management • Group peer support	Conventional medical rehabilitation – no detail	3m follow-up Sick leave Disability days off Employment status Work ability Quality of life Fatigue Coping skills
Injury-related conditions						

Park 2018 Canada Cluster RCT	Health Focused Intervention MDT Early (1-6 m) Musculoskeletal disorder (whiplash)	N=728 (367 (n=123)) • Active workers' compensation claims for musculoskeletal disorder • Participating in RTW program	OT and exercise therapist Duration/frequency unclear In person: individual Clinic	• RTW planning and coordination • Work hardening • Self-responsibility and self-management • Interventions addressing motivation	interdisciplinary approach focused on improving physical and functional abilities, RTW planning, individual counselling, and educational workshops	At discharge from intervention RTW (yes/no)
Sullivan 2006 Canada Cohort	Case and Service Coordination MDT Early (1-6 m) Whiplash injury	N=130 (70 (n=32)) • Employed prior to whiplash injury • Attending research rehabilitation clinic	OT, PT 10 wks; 1h per wk In person: individual Community-based	• Goal setting • Emotional/adjustment interventions • Self-responsibility and self-management • Psychosocial targets • Graded activity/exercise	Functional restoration physical therapy intervention	4 wks follow-up RTW Pain disability
Wu 2017 Australia	Health Focused Intervention MDT Early (1-6 m)	N=220 (107 (n=33)) • Aged over 18 • Sustained road trauma	OT, PT, rehabilitation physician, nurse (in-reach rehabilitation team) Duration based on patient need: 2 sessions of	• Medical rehabilitation • Emotional/adjustment interventions • Cognitive remediation	Usual care - ward-based rehabilitation; no detail	RTW Functional independence Mental health Pain

RCT	Road trauma injury		physiotherapy and/or OT per day In person: individual Acute hospital			
Inflammatory conditions						
Hammond 2017 UK Feasibility RCT	Work Modification Intervention Uni-disciplinary Long-term (12+m) Inflammatory arthritis	N=55 (29 (n=20)) • Aged over 18 • Diagnosis of rheumatoid arthritis • In paid work • Able to read, write, and understand English • Willing to receive VR	OT 2-4m: 4.5 h + 1.5h if required In person +remote; individual Clinic, telephone, home, workplace	• ***Vocational assessment*** • ***Job analysis*** • ***Goal setting*** • ***Vocational counselling/education*** • ***Case management/advocacy*** • ***Work hardening*** • ***Workplace adjustments*** • ***Ergonomics*** • ***Formal review*** • ***Self-responsibility and self-management*** • ***Occupational therapy [health condition]***	NHS usual care, written self-help work information	6 & 9m follow-ups Employment status Work self-efficacy Confidence to work Ability to manage arthritis at work
Keysor 2018 USA RCT	Case and Service Coordination MDT	N=287 (143 (n=104)) • Aged 21-65 • Employed (<15 hours) • Living or working in Massachusetts • Self-reported or diagnosed rheumatic	OT, PT 1.5-h meeting and follow-up support at 3-wks and 3m In person + remote: individual	• Vocational assessment • Goal setting • Vocational counselling/education • Case management/advocacy	Packet of written resources via email	6, 12, & 24m follow-ups Employment status Functional work limitations Presenteeism

	Target period unclear Rheumatic or musculoskeletal condition	or musculoskeletal condition	Clinic, telephone			
Macedo 2009 UK RCT	Multi-domain intervention Unidisciplinary Long-term (12+m) RA	N=32 (16 (n=15)) • RA diagnosis • Employed • Fluent English • Lived locally • Medium or high work instability	OT 6 months: 30min/session ≤6 sessions or 6m In person: individual Clinic, home, workplace	• ***Vocational assessment*** • ***Goal setting*** • ***Case management/ advocacy*** • ***Work modification, adaptation, adjustment*** • ***Ergonomics*** • ***Behavioural/ interpersonal interventions*** • ***occupational therapy [health condition]***	Usual care - routine reviews by the rheumatologist	6m follow-up Function Work productivity Coping RA disease activity
van Vilsteren 2017 Netherlands RCT	Multi-domain intervention MDT Target period unclear RA	N=150 (75 (n=63)) • Aged 18-64 • RA diagnosis • Employed >8 h/wk • Minor difficulties at work • <3m sick leave	OT, OHP, rheumatologist 12-wks: frequency? In person + remote: individual Clinic, telephone	• ***Job analysis*** • Case management/ advocacy (physician-led) • ***Work modification, adaptation, adjustment*** • ***Ergonomics*** • ***Formal review [job retention]*** • ***Formal reporting***	Usual care – no description	12m follow-up Working hours Productivity loss Functional work limitations QoL Pain & fatigue
Mental and physical health condition						

Berglund 2018 Sweden RCT	Multi-domain Intervention MDT Long-term (12+m) Mental illness + pain	N=427 (178 (n=161)) • on long-term sick leave for mental illness and/or chronic pain • 20–64 years	OT, psychologist, physician, and social worker ≤1year In person: individually Clinic	• Vocational assessment • Goal setting • Case management/advocacy • Emotional/adjustment intervention	Usual care available, if sought, via Swedish Public Employment Service	12m follow-up RTW (based on increased income) Income Mental health
Carlsson 2013 Sweden RCT	Health Focused Intervention MDT Early (1-6 m) Psychiatric or Musculoskeletal diagnoses	N=33 (18 (n=11)) • Sick-listed • Employed • ICD-10 diagnosis • Ongoing sick-leave (max. 28 days)	OT, PT, and psychotherapist. Duration/frequency unclear. Assessment only In person: individual GP clinic	• ***Vocational assessment*** • ***Formal reporting***	Usual care – no description	12m follow-up Sick leave
Mental health conditions						

Eklund 2013 Sweden Non-randomised experimental study	Health Focused Intervention Uni-disciplinary Early (1-6 m) Stress	N=84 (42 (n=42)) • ICD-10 Stress-related diagnosis • Employed • On sick leave	OT 16wks: Phase I & II 5 wks each, Phase III, job placement 6wks; 2.5h sessions. In person; group Clinic	• ***Vocational assessment*** • ***Goal setting*** • ***Vocational counselling/education*** • ***RTW planning and coordination*** • ***Work hardening*** • ***Emotional/adjustment interventions*** • ***Self-responsibility and self-management*** • ***Peer support***	Usual care - follow-up with the Social Insurance Office & employer. About 50% of reported additional focussed work rehabilitation e.g. PT, CBT, mindfulness training, pain rehabilitation or work training in an ordinary workplace.	12m follow-up Sick leave Worker role perception (individual & environment/social) Mental health
Hees 2013 Netherlands RCT	Multi-domain intervention Uni-disciplinary Early (1-6 m) Major depression	N=117 (78 (n=37)) • Aged 18-65 • Depression for at least 3 months • Absent from work for ≥25% of contracted hours for ≥8 wks	OT 4m: 18 OT sessions; 9 individual, 8 group, 1 with employer In person + remote; individual, group Clinic, telephone, workplace	• ***Vocational assessment*** • ***Job analysis*** • ***Goal setting*** • ***Vocational education*** • ***Case management/advocacy*** • ***RTW planning and coordination*** • ***Formal review*** • ***Self-responsibility and self-management*** • ***Peer support***	Usual care - psychiatric residents; clinical management, psychoeducation, supportive therapy and CBT. Pharmacotherapy as required.	6, 12, & 18m follow-ups Work participation Absenteeism (h) Time (d) to RTW Work limitations Self-efficacy Coping skills Health
Schene 2007 Netherlands	Health-focussed intervention Unidisciplinary	N=62 (30 (n=15)) • Aged above 18	OT + usual care 48wks: 2wk assessment; 24wk group session x1/wk(2h) + 12 individual	• ***Vocational assessment*** • ***Goal setting*** • ***Vocational counselling/education*** • ***Work Preparation***	Usual care - out-patient psychiatric treatment; clinical management, psychoeducation,	3, 6, 12, & 42m follow-ups Hours worked

RCT	Target period unclear Work-related depression	• Major depressive disorder without psychotic features • No history of psychosis or drug abuse • BDI >15 • Work reduction of at least 50% because of depression for a minimum of 10 weeks and maximum 2 y	sessions + x3 in person follow ups over 20wk In person: individual, group Outpatient clinic	• ***RTW planning and coordination*** • ***Behavioural/ interpersonal interventions***	supportive therapy, and CBT. Pharmacotherapy as required.	Mental health Work stress

Components in ***bold and italics*** indicate they were delivered by occupational therapists. RCT: Randomised controlled trial; RC: Randomised Controlled; OT: Occupational therapist; OHP: occupational health physician; PT: physiotherapist; VR: Vocational rehabilitation; MDT: Multidisciplinary team; RTW: Return to Work; HADS: Hospital Anxiety and Depression Scale; UK: United Kingdom; USA: United States of America; ICD-10: International Classification of Diseases 10; LBP: Low back pain; WLQ: Work limitations questionnaire; WIS: Work instability scale; NHS: National Health Service; RA: Rheumatoid Arthritis; HAQ: Health Assessment Questionnaire; COPM: Canadian occupational performance measure; DAS: Disease activity score; BDI: Beck depression inventory; min: minutes; h: hour; wk: week; m: month; y: year; CBT cognitive behavioural therapy.

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Risk of Bias

Risk of bias ratings are shown in Figure 2; only three (15%) studies had a low risk of bias (Keysor et al. 2018; Park et al. 2018; Wu et al. 2017). Across the studies, the lowest ratings were given to the "blinding of participants and personnel" domain because VR and OT require participants to actively engage in the treatment process. For the remaining domains, 14 studies (70%) used appropriate sequence generation, 10 studies (50%) used appropriate allocation concealment, 9 studies (45%) used appropriate blinding of outcome assessor and 7 studies (35%) included complete outcome data.

Figure 2 Risk of Bias Assessment


Risk of bias domains
D1
D2
D3
D4
D5
Overall
Study
Bendix 1995
Bendix 2000
Berglund 2018
Carlsson 2013
Eklund 2013
Fauser 2019
Wu 2017
Hammond 2017
Hees 2013
Johansson 1998
Jousset 2004
Keysor 2018
Kool 2007
Lambeek 2010
Macedo 2009
Park 2018
Schene 2007
Stapelfeldt 2011
Sullivan 2006
van Vilsteren 2017
Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from intended intervention.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.
Judgement
High
Some concerns
Low

Participants

Overall, 3,866 participants were included at entry into the studies with 1,889 (49%) receiving the experimental intervention. Participants' age ranged from 16 to 65 years. Over half of the participants 1,064 (56.3%) identified as female, with studies including between 21% (Kool, 2007) and 100% (Eklund, 2013) female participants in the intervention arm. Most studies (n=18) did not report participant ethnicity but where they did, most participants were identified as white. Other categories available were "not white" (Keysor, 2018) or African American, Asian, or other (Macedo, 2009).

Even though education is a predictor of RTW, the highest level of attainment was not reported in seven studies. Where it was reported, this varied widely. Local educational systems are organised differently across countries, and this resulted in the heterogeneity of reporting and meant meta-analysis was not possible.

Five studies (25%) reported occupation types following a simple categorisation such as unskilled or skilled workers (Hees et al., 2013; Jousset et al., 2004; Kool et al., 2007; Stapelfeldt et al., 2011; van Vilsteren et al., 2017). Three studies (15%) followed a more detailed classification following four broad levels: Level 4 (professionals and managerial); level 3 (associated professionals and technical/ skilled trades); level 2 (administrative, caring, leisure, sales) and level 1 (elementary occupations) (Eklund et al., 2013; Hammond et al., 2017; Macedo et al., 2009).

Interventions were directed at participants with a range of conditions or diagnoses, with most (n=11) related to pain or painful conditions. This included low back pain (Bendix et al., 1995, 2000; Jousset et al., 2004; Lambeek et al., 2010; Stapelfeldt et al., 2011), chronic low back and leg pain (Kool et al., 2007), wider spread musculoskeletal pain (Johansson et al., 1998; Park et al., 2018; Sullivan et al., 2006), mental illness and/or pain-related diagnosis (Berglund et al., 2018; Carlsson et al., 2013). Four studies included participants with inflammatory arthritis diagnoses (Hammond et al., 2017; Keysor et al., 2018; Macedo et al., 2009; van Vilsteren et al., 2017). Two included participants with depression (Hees et al., 2013; Schene et al., 2007). The remaining studies included participants with a range of health conditions including serious traumatic injury (Wu et al., 2017), stress-related disorders (Eklund et al., 2013) and cancer (Fauser et al., 2019).

Service Providers

Five studies reported a uni-disciplinary OT intervention (Eklund et al., 2013; Hammond et al., 2017; Hees et al., 2013; Macedo et al., 2009; Schene et al., 2007), but most (n=15) reported OT interventions delivered by occupational therapists within a multi-disciplinary team (MDT) program. Eleven studies indicated which components were delivered by occupational therapists including the five delivered only by occupational therapists [italicised in Table 1].

The MDTs included up to 10 different professionals working alongside occupational therapists. These included physiotherapists (also referred to as physical therapists) across 12 studies (Bendix et al., 1995, 2000; Carlsson et al., 2013; Fauser et al., 2019; Johansson et al., 1998; Jousset et al., 2004; Keysor et al., 2018; Kool et al., 2007; Lambeek et al., 2010; Stapelfeldt et al., 2011; Sullivan et al., 2006; Wu et al., 2017), medical physicians/specialists in eight (Berglund et al., 2018; Fauser et al., 2019; Johansson et al., 1998; Kool et al., 2007; Lambeek et al., 2010; Stapelfeldt et al., 2011; van Vilsteren et al., 2017; Wu et al., 2017), psychologists in five (Bendix et al., 1995, 2000; Berglund et al., 2018; Fauser et al., 2019; Johansson et al., 1998), nurses in three (Johansson et al., 1998; Kool et al., 2007; Wu et al., 2017), social workers in three (Berglund et al., 2018; Kool et al., 2007; Stapelfeldt et al., 2011), physical education teacher or exercise/sports therapist in three (Johansson et al., 1998; Kool et al., 2007; Park et al., 2018), occupational health physicians in two (Lambeek et al., 2010; van Vilsteren et al., 2017), psychotherapists (Carlsson et al., 2013), vocational counsellors (Johansson et al., 1998) and case managers (Stapelfeldt et al., 2011).

Experimental Interventions

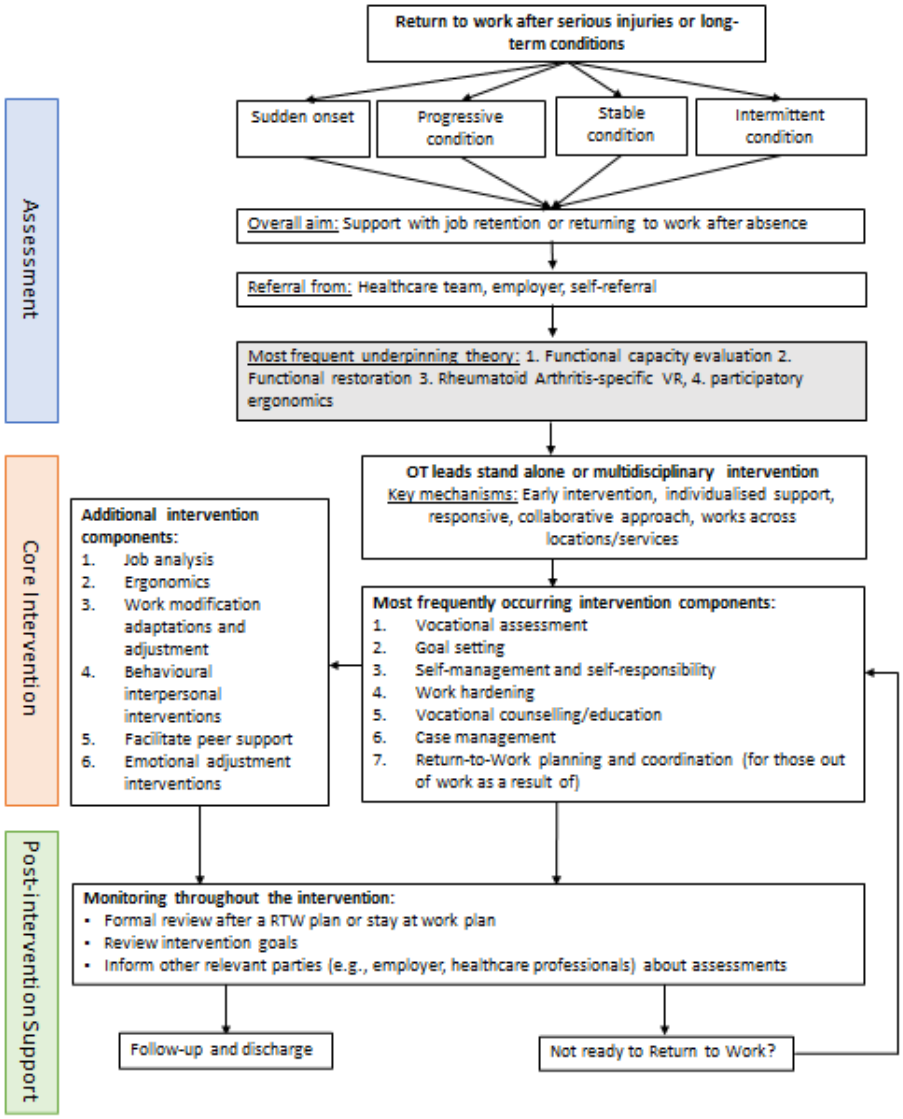
Figure 3 presents a summary of RTW interventions delivered by OTs for people with serious injuries and long-term conditions. Interventions were delivered individually (1:1) in half of the studies (n=10), or a mix of group and individual sessions in five studies or in small groups in four studies (Table 1). All study participants were seen in person except in one study, where the intervention was solely delivered remotely (e.g., telephone or letter) (Lambeek et al., 2010); five interventions delivered some intervention components remotely (e.g., telephone, information pack) (Table 1).

Twenty-four components were identified across all studies (Table 1) and the most frequently occurring were: vocational assessment (n=14), goal setting (n=11), self-responsibility and self-management techniques (n=11), work hardening (n=10), vocational

counselling/education (n=9), case management/advocacy (n=8) and RTW planning and coordination (n=8).

Eleven studies reported intervention components delivered by occupational therapists (italicised in Table 1). These included vocational assessment (7 studies), goal setting (6 studies), job analysis (5 studies), work hardening (5 studies), vocational counselling/education (4 studies), ergonomics (4 studies), RTW planning and co-ordination (3 studies), work modification adaptation and adjustment (3 studies), interventions to support self-management (3 studies), formal review after RTW (3 studies), case management/advocacy (3 studies), behavioural interpersonal interventions (2 studies), group/peer support (2 studies), emotional adjustment intervention (1 study) and formal reporting after assessment (1 study).

Figure 3: Summary of RTW OT interventions for people with serious injuries and long-term conditions.



Control Interventions

Control groups were included in 11 studies, and mostly received care as usual (Berglund et al., 2018; Carlsson et al., 2013; Eklund et al., 2013; Fauser et al., 2019; Hammond et al., 2017; Hees et al., 2013; Lambeek et al., 2010; Macedo et al., 2009; Schene et al., 2007; van Vilsteren et al., 2017; Wu et al., 2017), or were on a waiting list (Johansson, 1998). Participants in the remaining eight studies received an alternate intervention that was not identified as usual care including active physical training (Bendix et al., 2000; Jousset et al., 2004; Sullivan et al., 2006), written self-management materials (Keysor et al., 2018), pain-centred treatment (Kool et al., 2007), inter-disciplinary rehabilitation with counselling and educational workshops (Park et al., 2018), or a brief clinical intervention (Stapelfeldt et al., 2011). A single study delivered two additional interventions: 1. active physical training and 2.

psychological pain management combined with active physical training (Bendix et al., 1995); and both were treated as comparators for this review.

Impact on RTW outcomes

Eight studies described positive results on RTW favouring those in the intervention group (Bendix et al., 1995, 2000; Berglund et al., 2018; Hammond et al., 2017; Kool et al., 2007; Lambeek et al., 2010; Park et al., 2018; Sullivan et al., 2006). For participants with long-term physical health conditions, the interventions that led to favourable RTW outcomes included intensive MDT functional restoration (Bendix et al., 1995, 2000), function-centred rehabilitation (Kool et al., 2007), and integrated multi-disciplinary case management (Lambeek et al., 2010). For those with injury-related conditions, the interventions included a multi-disciplinary progressive goal attainment programme for participants with whiplash injury (Sullivan et al., 2006), and an interdisciplinary functional rehabilitation programme plus motivational interviewing (MI) for participants with musculoskeletal disorders (Park et al., 2018). One study showed a positive RTW outcome for patients with inflammatory conditions (rheumatoid arthritis; RA), following a job retention programme (Hammond et al., 2017). Finally, Berglund (2018) tested two interventions (MDT VR and acceptance commitment therapy (ACT)) to usual care; the intervention increased employability in patients on long-term sick leave due to common mental illness and/or chronic pain.

Four showed mixed results (Hees et al., 2013; Johansson et al., 1998; Macedo et al., 2009; Schene et al., 2007). Macedo (2009) compared case coordination plus targeted OT to usual care for participants with RA. At 6-months follow-up, there was significantly greater work stability in the OT group than in the usual care group. But there were no significant differences between the two groups for workdays missed per month or percentage of days missed per month. In a cognitive behavioural inpatient pain management program for people with chronic musculoskeletal pain by Johansson (1998) the intervention increased occupational activity but did not decrease the amount of sick leave at 1-month follow-up. Hees (2013) did not find a significant difference in work participation between an adjuvant OT intervention and usual care for people with depression. However, those in the intervention group showed greater improvement in depression symptoms and an increased probability of long-term RTW in good health. Schene (2007) tested the effect of OT compared to usual care for people with major depression. Over the first 18 months, those receiving OT worked significantly more than usual care, but this was not sustained in the longer term (months 19–42).

In two studies participants in the intervention group returned to work sooner or had lower rates of permanent job loss, but the outcomes did not reach statistical significance (Jousset et al., 2004; Keysor et al., 2018).

Finally, in three studies, both the intervention and control groups improved (Carlsson et al., 2013; Eklund et al., 2013; Fauser et al., 2019); and three other studies reported that participants in the control group returned to work sooner or had less sickness absence than those in the intervention (Stapelfeldt et al., 2011; van Vilsteren et al., 2017; Wu et al., 2017).

Discussion and implications

This systematic review investigated the effectiveness and mechanisms of action of OT RTW interventions for working-aged people with serious injuries or long-term physical/mental health conditions. To our knowledge, this is the first such systematic review since Désiron (2011) to do so.

Overall, the effectiveness of OT interventions for supporting RTW following illness or injury showed varying results. Studies which included a more individualised, person-centred, solely work-focused approach with vocational assessment, goal setting and job analysis appeared to be linked to a better RTW outcome.

However, in the studies where OT was delivered as part of a multidisciplinary intervention the components delivered by occupational therapists were often not clearly defined. Studies reporting RTW rates for people experiencing low back pain, musculoskeletal conditions and arthritis appeared to show more promising results than those focused on other conditions. However, these results need to be considered alongside the assessed risk of bias as a meta-analysis was not possible to conduct because of heterogeneity in the measurement of RTW outcomes and data collection points.

Clinical heterogeneity across individual studies makes it difficult to draw conclusions on the effectiveness of OT interventions on RTW. The differences across the studies were expected due to the diverse ways in which occupational therapists work with different populations to support work needs and the interacting components of VR interventions. We also expected that where occupational therapists delivered interventions solely focused on work this would positively impact work status outcomes. However, this was not always borne out, possibly due to outcome sensitivity issues or challenges measuring work outcomes. For instance, a positive outcome such as reduced sickness absence might be attributable to an OT

intervention; however, sickness absence was measured in different ways by half of the studies included in this review. The differences can be accounted for in part by local policies related to employee remuneration and/or state welfare payments. Eklund (2013; p87) explains, “In Sweden, a person can be on 100% sick leave or partial sick leave at 75, 50 or 25%, depending on his or her current workability”, compared with the UK where a person’s sickness absence is typically measured in days.

Heterogeneity in research and clinical practice seeking to measure change is not a new issue and is linked to the nature of complex interventions that encompass OT and VR (Skivington et al., 2021) and the continuing complexity of measuring work status outcomes (Wasiak et al., 2007; Watkin et al., 2020). Selecting standardised outcome measures in research requires consideration and stakeholder involvement (Skivington et al., 2021) and in future could support meaningful meta-analyses for OT and VR interventions.

The interventions included in this review usually delivered OT as part of an MDT for several health conditions. OT as a stand-alone discipline was delivered in two interventions for inflammatory arthritis (Hammond et al., 2017; Macedo et al., 2009), and one intervention for mental health conditions (Eklund et al., 2013). In the MDT interventions it was not always possible to determine which components were delivered by the occupational therapists; though their involvement was sometimes referred to as reporting to stakeholders (e.g., employers, family). This limits the understanding of the impact of occupational therapists supporting RTW. We recommend that researchers carefully consider how best to describe MDT and discipline-specific VR intervention components, such as those espoused in the RTSS (van Stan et al., 2019). Better descriptions will highlight the role of OTs and it would potentially increase the OTs’ knowledge and understanding of their roles and responsibilities in the delivery of VR.

MDT support has been recommended (Désiron et al., 2011); while occupational therapists may lead support around RTW, the complexity of interventions providing support to returning to work require the expertise of other professionals to meet all the needs of the patients. This may lead to professionals overlapping support without clear differentiation between professionals. However, in research, it is important to know who is doing what and to recognise the unique role of each professional.

Data extraction for this review was guided by TIDieR (Hoffmann et al., 2014), plus an extensive, pre-defined glossary of VR terms. Unfortunately, none of the included studies

followed reporting guidelines to enhance intervention description, resulting in little clarity regarding the interventions or their components. This hampered study comparison and a deeper understanding of the theories underlying the interventions. The glossary of VR terms proved beneficial for synthesising the included studies. Developing a taxonomy of VR intervention components could standardise intervention descriptions, and by extension further knowledge in the area by facilitating cross-study comparisons. Ultimately this could contribute to improved intervention design, reduce research waste, and increase the likelihood of clinical effectiveness being observed (Hoffmann et al., 2014; Skivington et al., 2021)

Strengths and limitations

We followed guidelines that helped us produce a robust narrative synthesis (Popay et al., 2006). This included assessing the methodological quality of studies by applying the Cochrane risk of bias tool (Higgins et al., 2011) and ensuring that studies were critically appraised when synthesising their findings. Inter-rater reliability was improved through multiple reviewers being involved in all the review processes. Additionally, the search strategy was peer-reviewed by a librarian who specialised in systematic reviews.

Using published literature to frame our data extraction method (TIDieR and RTSS) added robustness to the synthesis. Our research team also included two occupational therapists experienced in VR who reviewed the intervention descriptions to improve the accuracy of the classification of intervention components.

One potential limitation is that the review may have missed some studies because OT was not named within the title and abstract. Systematic reviewers often limit initial search strategies to the title and abstract levels. We strongly recommend that researchers reporting primary research into the effectiveness of occupational therapy interventions to support people to work, refer to occupational therapy in the title to aid study identification and that they use recognised work status outcomes, the range of which is well documented (Wasiak et al., 2007).

Other limitations are that we only included studies in English, unpublished studies were excluded, and the evidence identified has a substantial risk of bias; therefore, we have interpreted our results cautiously. Finally, even though several interventions reported the same outcome (e.g., sick leave), because of methodological differences in measuring the

outcome, and variability in the follow-up time points, it was not possible to conduct a meta-analysis combining data from different studies.

Conclusion

This systematic review investigated the effectiveness of OT interventions supporting RTW for people with long-term physical/mental health conditions or serious injuries. Future research should aim to harmonise intervention descriptions and outcomes and attribute correctly the support delivered by each professional to improve the understanding of what practices are most beneficial to support RTW. Additionally, methods such as realist synthesis may improve understanding of the underlying intervention mechanisms leading to a successful RTW.

Key findings

- Individualised interventions focused on return to work resulted in better work outcomes.
- Occupational therapy involvement is not always reported accurately.
- Heterogeneity in work status outcomes hampers the interpretation of findings.

What the study has added

This systematic review has highlighted the need to standardise descriptions of work outcomes, intervention components, and occupational therapists' work to correctly evaluate the effectiveness and mechanisms underlying RTW interventions.

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Appendix 1 – Search Strategy

Ovid Medline

exp occupational therapy/
"occupational therap*".ti,ab.
"occupational therap*".mp.
exp vocational rehabilitation/
((vocation* or work or occupation* or psycholog*) adj1 rehabilitation).mp.
((work or job or employ*) adj1 (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*)).mp.
((work or job or employ*) adj1 (attitud* or productiv* or self-efficacy)).mp.
(workplace adj2 (adjust* or adapt* or accomodat* or interven*)).mp.
"disability management".mp.
(modifi* adj1 dut*).mp.
"vocational guidance".mp.
((work or job or employ*) adj1 role*).mp.
ergonomic.mp.
exp return to work/
absenteeism.mp.
presenteeism.mp.
(sick* adj1 (leave or absence)).mp.
employability.mp.
absence.mp.
work.mp.
job.mp.
function.mp.
exp sick leave/
return-to-work.mp.
("return to work" or RTW).mp.
("functional capacity" adj1 (training or evaluation)).mp.
1 or 3
4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26
27 and 28
limit 29 to yr="1980 - 2022"

Ovid Embase

exp occupational therapy/

"occupational therap*".ti,ab.

exp vocational rehabilitation/

((vocation* or work or occupation* or psycholog*) adj1 rehabilitation).ti,ab.

((work or job or employ*) adj1 (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*)).mp.

((work or job or employ*) adj1 (attitud* or productiv* or self-efficacy)).ti,ab.

(workplace adj2 (adjust* or adapt* or accomodat* or interven*)).ti,ab.

"disability management".ti,ab.

(modifi* adj1 dut*).ti,ab.

"vocational guidance".ti,ab.

((work or job or employ*) adj1 role*).ti,ab.

ergonomic.ti,ab.

exp return to work/

absenteeism.ti,ab.

presenteeism.ti,ab.

(sick* adj1 (leave or absence)).ti,ab.

employability.ti,ab.

absence.ti,ab.

work.ti,ab.

job.ti,ab.

function.ti,ab.

exp sick leave/

return-to-work.ti,ab.

("return to work" or RTW).ti,ab.

("functional capacity" adj1 (training or evaluation)).ti,ab.

exp employment status/

exp work capacity/

(random$ or placebo$ or single blind$ or double blind$ or triple blind$).ti,ab.

RETRACTED ARTICLE/

or/28-29

(animal$ not human$).sh,hw.

(book or conference paper or editorial or letter or review).pt. not exp randomized controlled trial/

(random sampl$ or random digit$ or random effect$ or random survey or random regression).ti,ab. not exp randomized controlled trial/

30 not (31 or 32 or 33)

exp cohort analysis/

" exp longitudinal study/"

exp prospective study/

exp follow up/

cohort$.tw.

or/35-39

34 or 40

1 or 2

3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27

42 and 43 and 41

limit 44 to yr="1980 - 2022"

limit 45 to (human and (adolescent <13 to 17 years> or adult <18 to 64 years> or aged <65+ years>))

Ovid PsycINFO

exp occupational therapy/

"occupational therap*".ti,ab.

exp vocational rehabilitation/

((vocation* or work or occupation* or psycholog*) adj1 rehabilitation).ti,ab.

((work or job or employ*) adj1 (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*)).ti,ab.

((work or job or employ*) adj1 (attitud* or productiv* or self-efficacy)).ti,ab.

(workplace adj2 (adjust* or adapt* or accomodat* or interven*)).ti,ab.

"disability management".ti,ab.

(modifi* adj1 dut*).ti,ab.

"vocational guidance".ti,ab.

((work or job or employ*) adj1 role*).ti,ab.

ergonomic.ti,ab.

exp return to work/

absenteeism.ti,ab.

presenteeism.ti,ab.

(sick* adj1 (leave or absence)).ti,ab.

employability.ti,ab.

absence.ti,ab.

work.ti,ab.

" job.ti,ab."

function.ti,ab.

exp sick leave/

return-to-work.ti,ab.

("return to work" or RTW).ti,ab.

("functional capacity" adj1 (training or evaluation)).ti,ab.

*employment status/

*reemployment/

((cohort or longitudinal or prospective or retrospective).ti,ab,id. or longitudinal study.md. or prospective study.md. or retrospective study.md.) not "Literature Review".md.

clinical trials/ or "treatment outcome clinical trial".md. or ((randomi?ed adj7 trial*) or ((single or doubl* or tripl* or treb*) and (blind* or mask*)) or (controlled adj3 trial*) or (clinical adj2 trial*)).ti,ab,id.

28 or 29

1 or 2

3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27

30 and 31 and 32

limit 33 to yr="1980 - 2022"

limit 34 to (human and (adolescence <13 to 17 years> or adulthood <18+ years>))

Cochrane Library

[mh "occupational therapy"]

occupational therap*

[mh "vocational rehabilitation"]

((vocation* or work or occupation* or psycholog*) NEXT rehabilitation)

((work or job or employ*) NEXT (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*))

((work or job or employ*) NEXT (attitud* or productiv* or self-efficacy))

(workplace NEAR (adjust* or adapt* or accomodat* or interven*))

disability management

(modifi* NEXT dut*)

vocational guidance

((work or job or employ*) NEXT role*)

ergonomic

[mh "return to work"]

("return to work" or RTW)

[mh absenteeism]

absenteeism

presenteeism

(sick* NEXT (leave or absence))

employability

absence

work

job

function

[mh "sick leave"]

(“functional capacity” NEXT (training or evaluation))

[mh employment]

#1 and #2

#3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26

#27 AND #28

ClinicalTrials.Gov

1. (occupational therapy OR occupational therapist) AND (vocational rehabilitation OR work rehabilitation OR occupation rehabilitation OR psychological rehabilitation)

2. (occupational therapy OR occupational therapist) AND (work hardening OR work modification OR work adjustment OR work reintegration OR work trial OR work resumption OR work status OR work retention OR work retain)

3. (occupational therapy OR occupational therapist) AND (job hardening OR job modification OR job adjustment OR job reintegration OR job trial OR job resumption OR job status OR job retention OR job retain)

4. (occupational therapy OR occupational therapist) AND (employment modification OR employment adjustment OR employment reintegration OR employment trial OR employment resumption OR employment status OR employment retention OR employment retain)

5. (occupational therapy OR occupational therapist) AND (work attitude OR work productivity OR work self-efficacy)

6. (occupational therapy OR occupational therapist) AND (job attitude OR job productivity OR job self-efficacy)

7. (occupational therapy OR occupational therapist) AND (employment attitude OR employment productivity OR employment self-efficacy)

8. (occupational therapy OR occupational therapist) AND (workplace adjustment OR workplace adaptation OR workplace accommodation OR workplace intervention)

9. (occupational therapy OR occupational therapist) AND (disability AND management)

10. (occupational therapy OR occupational therapist) AND (modify duties OR modified duties)

11. (occupational therapy OR occupational therapist) AND (vocational guidance)

12. (occupational therapy OR occupational therapist) AND (work role OR job role OR employed role OR employment role)

13. (occupational therapy OR occupational therapist) AND (ergonomic OR absenteeism OR presenteeism OR sick leave OR sickness absence OR employability OR absence OR work OR job OR function OR return-to-work OR return to work OR RTW)

14. (occupational therapy OR occupational therapist) AND (functional capacity training OR functional capacity evaluation)

Second search: (Limited to: Adult, Older Adult, recruiting, active not recruiting, completed)

Intervention field: occupational therapy OR OT

Other terms field: work OR employment OR job OR vocational OR sick leave OR sickness absence

CINAHL

MH "occupational therapy+"

"occupational therap*"

(MH "Rehabilitation, Vocational+")

(vocation* or work or occupation* or psycholog*) N1 rehabilitation

(work or job or employ*) N1 (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*)

(work or job or employ*) N1 (attitud* or productiv* or self-efficacy)

workplace N2 (adjust* or adapt* or accomodat* or interven*)

"disability management"

(modifi* N1 dut*)

"“vocational guidance”"

((work or job or employ*) N1 role*)

"ergonomic"

MH "return to work+"

absenteeism

presenteeism

(sick* N1 (leave or absence))

employability

absence

work

job
function
MH "sick leave+"
(“return to work” or RTW)
(“functional capacity” N1 (training or evaluation))
MH "Job Re-Entry+"
Prospective studies/
Nonconcurrent prospective studies/
(cohort adj (study or studies)).tw.
(observational adj (study or studies)).tw.
or/27-29
(MH "Clinical Trials+")
PT Clinical trial
TX clinic* n1 trial*
TX ((singl* n1 blind*) or (singl* n1 mask*))
or TX ((doubl* n1 blind*) or (doubl* n1 mask*))
or TX ((tripl* n1 blind*) or (tripl* n1 mask*))
or TX ((trebl* n1 blind*) or (trebl* n1 mask*))
TX randomi* control* trial*
(MH "Random Assignment")
TX random* allocat*
TX placebo*
(MH "Placebos")
(MH "Quantitative Studies")
TX allocat* random*
or/31-44
30 or 45
1 or 2
or/3-25
46 and 47 and 48 (limiters: human; adolescent and adult age groups, dates Jan 1980 to June 2022)

ProQuest Theses & Dissertations

MESH(occupational therapy)

TI,AB("occupational therap*")

MESH(vocational rehabilitation)

TI,AB((vocation* or work or occupation* or psycholog*) N/1 rehabilitation)

TI,AB((work or job or employ*) N/1 (hardening or modif* or adjust* or reintegrat* or trial or resumption or status or retention or retain*))

TI,AB((work or job or employ*) N/1 (attitud* or productiv* or self-efficacy))

TI,AB(workplace N/1 (adjust* or adapt* or accomodat* or interven*))

TI,AB(disability management)

TI,AB(modifi* N/1 dut*)

TI,AB("vocational guidance")

TI,AB((work or job or employ*) N/1 role*)

TI,AB(ergonomic)

MESH(return to work)

TI,AB(absenteeism)

TI,AB(presenteeism)

TI,AB(sick* N/1 (leave or absence))

TI,AB(employability)

TI,AB(absence)

TI,AB(work)

TI,AB(job)

TI,AB(function)

MESH(sick leave)

TI,AB(return-to-work or "return to work" or RTW)

TI,AB("functional capacity" N/1 (training or evaluation))

MESH(return to work programs)

MESH(absenteeism)

MESH(vocational education)

1 or 2

3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27

28 and 29

Limited to following databases: Nursing & Allied Health Database; Health & Medical collection; ProQuest Dissertations & Theses A&I: Health & Medicine; Research Library: Health & Medicine: and India Database: Health & Medicine.

Dates: 1/1/1980-31/06/2022

Limited to scholarly journals, dissertations & theses; reports; conference papers and proceedings, speeches, and presentations, working papers, and government & official publications

Appendix 2 – Glossary of intervention components

Components focussed on vocational content (included in Hart et al. 2006, and supplemented By Cullen et al., 2018).

Initial assessment
Vocational assessment: skills, abilities, preferences, e.g., functional capacity evaluation
Job analysis: analysis of the demands a job place on the person engaged in the job task (physical, cognitive, psychological, physiological, social)
Goal setting: Can include goal setting, goal planning, goal attainment scaling and goal attainment, among others. [new component]

Before job return/placement
Vocational counselling/education*:* work knowledge and education; practical problem-solving; setting or adjusting vocational goals
Work Preparation: job search; preparing applications/CVs; interview skills
Specific vocational skills training: e.g., computer/clerical skills
Case management/advocacy: interventions on behalf of client (whether client present or not) intended to improve work situation including referrals; transport, housing, and logistics; negotiations with employers
Work trials: temporary practice jobs (usually unpaid), part or full-time, clinic or community-based
Job Brokerage: providing support and assistance to disabled job seekers to find and retain a suitable job
RTW planning and coordination: Developing RTW plan, negotiating phased RTW with employers, coordinating RTW with wider stakeholders (employer representative, job/employment service, State or government welfare claim office, occupational health provider etc)
Work hardening: Graded work simulation based on patients' ability level being incrementally increased, to attempt to reach pre-injury work level in a safe and timely manner
****Modification, adaptation, or adjustment:*** may include adjustments to work arrangements, work premises or job and workload. Could be temporary or permanent to facilitate staying at or returning to work, with the aim being to return to usual job.
****Ergonomics:*** providing advice or recommendations for ergonomic equipment and or education

Following job placement
Job coaching: Accompanying patient to jobsite or working with patient/employer off-site, on the job training; troubleshooting; and development of strategies and job performance and job maintenance; includes employer/co-worker education and job modifications
Developing natural jobsite supports: Enlisting and mentoring a co-worker or supervisor to act as a buddy/coach to support the patient in the workplace
Job follow along: ongoing contact with client and/or employer and/or family for monitoring and troubleshooting; implies formal coaching has ended.

*__Formal work review or reporting:__ formal communication between parties to describe assessment findings and or progress during graded RTW

Components based on Psychological Principles
Cognitive remediation: therapy focusing on improving or ameliorating impairments in attention, memory, problem-solving, etc. Includes restorative and compensatory approaches.
Emotional/adjustment interventions: therapy focused on mood stability, self-concept, awareness, and adjustment situation. Manage perceptions, beliefs and expectations of recovery and disability. (e.g., CBT)
Behavioural/interpersonal interventions: therapy directed at interpersonal behaviour, social judgement etc.
Family counselling/education: providing information, practical problem solving, discussing relationship difficulties, and providing support and stability to the family system.
Self-responsibility and self-management type 1: Interventions focused on identifying, stage of readiness for RTW (self-efficacy and decision balance) (Behavioural psychological tradition)
Self-responsibility and self-management type 2: Interventions focusing on enhancing coping resources and addressing non-effective ones (e.g., alcohol and substance abuse/misuse) (can be outcome if cure not possible)
Motivation-based: Interventions addressing motivational barriers and enhance motivation
Psychological distress intervention: Interventions identifying and addressing psychological distress (through psychological diagnosis) (e.g., EMDR, other trauma-specific interventions)
Peer or group support: Interventions that facilitate support by using peers individually or in groups
Non-specific VR
Physical/occupational therapy
Graded activity/exercise
Speech and language therapy/pathology
Substance abuse treatment
Assistive technology/augmentative and assistive communication
Educational consultation
Medical specialities: Physical medicine and rehabilitation medicine; Neurology; Psychiatry; Pain management
Therapeutic recreation
*Additional component not extracted from Hart et al. (2006) or Cullen et al. (2018).

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Appendix 3: Underlying theories for interventions

The following appendix presents the programs and theories underlying the development of the interventions included in the systematic review.

Author, Country & Study design	Health condition	Program and/or underlying theory
Bendix et al. (1995) Denmark; RCT	Low back pain	Functional restoration (Mayer et al., 1987)
Bendix et al. (2000) Denmark; RCT	Low back pain	Functional Restoration (Mayer et al., 1987)
Johansson et al. (1998) Sweden; RC Study	Chronic musculoskeletal pain	Cognitive-behavioural pain management program (Linton et al., 1985)
Jousset et al. (2004) France; RCT	Low back pain	Functional Restoration Program (Mayer et al., 1987)
Kool et al. (2007) Switzerland; RCT	Chronic low back and leg pain	Function-centred rehabilitation (Matheson et al., 1985; Mayer et al., 1987)
Lambeek et al. (2010) Netherlands; RCT	Low back pain	Integrated care management (Anema et al., 2003; Fordyce WE., 1976)
Stapelfeldt et al. (2011) Denmark; RCT	Low back pain	Multidisciplinary intervention + Brief Intervention (Jensen et al., 2011)
Fauser et al. (2019) Germany; Cluster RCT	Cancer	Work-related Medical Rehabilitation (Bieniek and Bethge, 2014; Isernhagen, 1992; Streibelt and Buschmann-Steinhage, 2011)

Author, Country & Study design	Health condition	Program and/or underlying theory
Park et al. (2018) Canada; Cluster RCT	Musculoskeletal disorder (whiplash)	Motivational Interviewing to Functional Restoration (William Miller, 2002)
Sullivan et al. (2006) Canada; Cohort	Whiplash injury	Progressive goal attainment program – PGAP (Sullivan, 2003)
Wu et al. (2017) Australia; RCT	Road trauma injury	Early Rehabilitation after hospital admission (Steiner et al., 2016)
Hammond et al. (2017) UK; Feasibility RCT	Inflammatory arthritis	Job retention VR (Allaire et al., 2003)
Keysor et al. (2018) USA; RCT	Rheumatic or musculoskeletal condition	Work Disability Prevention Program "Work It" (Allaire et al., 2003)
Macedo et al. (2009) UK; RCT	Rheumatoid Arthritis	Targeted, comprehensive occupational therapy (Allaire et al., 2003)
van Vilsteren et al. (2017) Netherlands; RCT	Rheumatoid Arthritis	Participatory workplace intervention (Anema et al., 2003)
Berglund et al. (2018) Sweden; RCT	Mental illness + pain	Acceptance and commitment therapy (Hayes et al., 2006)
Carlsson et al. (2013) Sweden; RCT	Psychiatric or Musculoskeletal diagnoses	Early Multidisciplinary Assessment Early intervention
Eklund et al. (2013) Sweden; Non-randomised experimental study	Stress	Redesigning Daily Occupations (ReDO) rehabilitation programme (Eklund and Erlandsson, 2011)

Author, Country & Study design	Health condition	Program and/or underlying theory
Hees et al. (2013) Netherlands; RCT	Major depression	Adjuvant OT (Programme theory) (Schene et al., 2007)
Schene et al. (2007) Netherlands; RCT	Work-related depression	Adjuvant OT (Devereaux and Carlson, 1992; Dixon et al., 2001; Mintz et al., 1992; Simon et al., 2000)
RCT: Randomised Controlled Trial; OT: Occupational Therapy.		

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