Interventions for promoting physical activity in people with neuromuscular disease

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[Intervention Protocol]

Interventions for promoting physical activity in people with neuromuscular disease

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ABSTRACT

This is a protocol for a Cochrane Review (Intervention). The objectives are as follows:

To assess the effects of interventions designed to promote physical activity in people with NMD, compared with no intervention or alternative interventions.

BACKGROUND

Description of the condition

People with neuromuscular disease (NMD) are part of a clinically heterogeneous population with inherited or acquired disorders of muscle, peripheral nerve, the neuromuscular junction, or anterior horn cell of the spinal cord (Fowler 2002; Öksüz 2011). Diagnosis is based on genetic testing where possible, biopsy, and established clinical criteria. In most types of NMD, prevalence rates are estimated to vary between 1 and 10 per 100,000 population. The estimated prevalence is higher for Charcot-Marie-Tooth disease and postpolio syndrome, at over 10 per 100,000 (Deenen 2015).

NMD manifests with different patterns of disease activity and progression. However, muscle weakness and limitations in activities of daily life are often common features. Secondary disuse weakness and cardiovascular deconditioning may develop over time, which increases the risk of further chronic health problems (Aitkens 2005; Apabhai 2011; Dal Bello-Haas 2013; Fowler 2002; Jimenez-Moreno 2017; Kilmer 2005; McDonald 2002; Öksüz 2011; Phillips 2009; Ramdharry 2017; Voet 2013; White 2004; WHO 2010).

Description of the intervention

The World Health Organization (WHO) recommends regular and adequate physical activity, which is based on a minimum duration, intensity, frequency, and type of physical activity in different age groups. For people unable to meet the recommendations due to health conditions, WHO advises being as physically active as possible (WHO 2010). In muscle-wasting conditions, recommendations for exercise include more specific information on precautions and progression, as well as guidance on duration, intensity, frequency, and type of exercise (MDUK 2014).

This review will include any intervention that aims to promote physical activity in adults or children with NMD. We will use the WHO definition of physical activity as "any bodily movement produced by skeletal muscles that requires energy expenditure – including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits" (WHO 2010; WHO 2018). As highlighted by the American College of Sports Medicine (ACSM), 'physical activity' and 'exercise' are sometimes used interchangeably, but the latter is a specific form of physical activity that consists of "planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness" (ACSM 2010).

Exercise is often the form of physical activity studied in NMD. However, there are other potential types of lifestyle intervention (as per the WHO definition, such as monitoring, advice, and support) that may also help to promote physical activity (Foster 2005; Foster 2013; Richards 2013a; Richards 2013b). At a population level, a multi-component approach is often taken, involving policy and environmental changes, as well as behavioural and informational interventions (Baker 2015).

How the intervention might work

In healthy populations, short- to medium-term improvements in self-reported physical activity and cardiorespiratory fitness follow physical activity interventions compared with no intervention, attention control (e.g. general health check of an equivalent duration), minimal intervention, or a combination of these (Foster 2005). There is also some evidence in favour of particular modes of intervention delivery, such as use of technologies with support from a trained professional (Foster 2013). However, this evidence excludes people with medical conditions, and findings after community-level interventions have been inconsistent (Baker 2015; Foster 2005; Foster 2013). For the general population, increasing and maintaining regular physical activity is likely to be beneficial in terms of reducing all-cause mortality risk, as well as for the primary and secondary prevention of chronic diseases, such as cardiovascular disease, diabetes mellitus, colon and breast cancer, hypertension, obesity, osteoporosis, and depression. At a mechanistic level, routine physical activity has been associated with enhanced mental well-being, reduced blood pressure, and improvement in glucose control and other biomarkers for inflammation and cardiovascular disease risk (Warburton 2006). These effects might reduce the need for pharmacological or other treatment, the associated costs, and possible adverse effects. While the risk of chronic disease will increase with age, the benefits of physical activity have been shown across the lifespan, with recommended 'dosages' adjusted for children, adults, and older adults (Warburton 2006; Warburton 2017; WHO 2010).

The effect of interventions to promote physical activity may be different in people with medical conditions, such as NMD. Several studies have highlighted that people with particular types of NMD are less physically active than healthy controls, and have higher perceived barriers to becoming physically active (Aitkens 2005; Apabhai 2011; Heutinck 2017; McCrory 1998; Phillips 2009; Ramdharry 2017). This could suggest differences in the effect of physical activity in terms of biological mechanism and, or facilitation at an individual or community level. People with different types of NMD may also respond differently to physical activity interventions because of the clinical heterogeneity of their conditions (Voet 2013) (with variable disease pattern, severity, and progression), as well as differences in the timing of disease onset in relation to developmental and ageing processes (e.g. childhood versus adult onset of NMD). Furthermore, people with NMD who are non-ambulant may be at a greater risk from sedentary behaviour than those who are ambulant, with a potential impact on health outcomes that is independent of physical activity levels. As such, prolonged sitting could confound the effect of increased physical activity in terms of the risk for all-cause mortality and chronic disease. However, there is evidence to suggest that physical activity can attenuate, if not negate, risks associated with prolonged sitting (Ekelund 2016).

In terms of potential adverse effects of physical activity, there is currently limited evidence to assess the risk in NMD. Increasing physical activity may not always be appropriate for all people with NMD. The overworking of muscles affected by NMD could increase the risk of muscle damage and impairment. For example, overexertion can lead to myalgia (muscle pain), myoglobinuria (muscle protein in the urine, associated with muscle breakdown), weakness, and fatigue in people with muscle disease (MDUK 2014). One systematic review of exercise interventions in people with muscle disease highlighted that adverse event data from five included randomised controlled trials (RCT) was incomplete (Voet 2013). There was no RCT evidence for exercise intervention in a systematic review involving people with McArdle disease (Quinlivan 2011). In peripheral neuropathy, one systematic review (including three RCTs) found one incidence of lower limb pain with

exercise intervention, which was attributed to the aggravation of arthritis (White 2004). Although one systematic review of RCTs in amyotrophic lateral sclerosis found no reported adverse effects due to exercise, fatigue and rapid deterioration resulting in death were reasons given for participants dropping out from one of the two included studies (Dal Bello-Haas 2013).

Why it is important to do this review

The purpose of this review is to better understand the effects of different approaches for people living with NMD to become more physically active as part of a management strategy for health and well-being.

OBJECTIVES

To assess the effects of interventions designed to promote physical activity in people with NMD, compared with no intervention or alternative interventions.

METHODS

Criteria for considering studies for this review

Types of studies

We will include parallel RCTs involving people with any type of NMD. We will include randomised cross-over studies that match our inclusion criteria. In cross-over studies, participants each undergo more than one intervention. This study design is considered suitable for assessing "a temporary effect in the treatment of stable, chronic conditions" (Higgins 2011a), and so may be suitable in some but not all types of NMD (where progression is expected to lead to a clinically important decline within the timescale of the study). We will perform a Sensitivity analysis for the use of data from cross-over studies.

We will also include quasi-RCTs, defined as trials that allocate participants to groups using methods that are partly systematic, for example, by alternation, use of a case record number, or date of attendance. We will refer to other types of trial in the 'Discussion' only.

We will include studies reported as full text, those published as abstract only, and unpublished data. There will be no restrictions as to language. We will perform a Sensitivity analysis for publication status.

Types of participants

We will accept studies that include adults, children, or both with NMD. We will consider studies in which NMDs have been diagnosed by any established criteria, and studies that do not describe diagnostic criteria or predate genetic diagnosis. As part of the spectrum of NMD, we will include genetic or acquired peripheral nerve disorders, muscle diseases, neuromuscular junction, and motor neuron disorders. We will exclude mechanical nerve compression conditions, such as carpal tunnel syndrome. We will report comorbidities where this information is available.

If studies include a subset of participants with NMD, we will contact the investigators or study sponsors to gather any relevant subgroup data not reported; if they are unable or unwilling to provide subgroup data, we will not include these studies in the meta-analysis. We will perform a Sensitivity analysis for the use of diagnostic criteria and we will perform subgroup analyses to explore differences in the types of participants.

Types of interventions

We will include trials of any practical (e.g. exercise or environmental adaptation), informational, or motivational intervention that is designed to promote physical activity, compared with no intervention, or another intervention designed to promote physical activity (Foster 2005). This will include trials of any mode of delivery, dose, duration, or intensity, in a community setting. We will include co-interventions if they are provided to each group equally. For the purposes of this review, very brief interventions that might promote physical activity, such as general health checks, will be included as interventions although these have also been defined as an attention control comparison elsewhere (Foster 2005). We will report details of supervisory support provided as part of an intervention, and we will report any concurrent treatment and care where this information is provided. We will perform subgroup analyses to explore differences in the delivery of interventions.

Potential interventions will include one or a combination of the following (Foster 2005; Foster 2013; Richards 2013a; Richards 2013b):

- one-to-one advice or support;
- group advice or support;
- telephone advice or support;
- Internet-based, mobile apps, or tele-health (remote) advice or support;
- written advice or support;
- self-directed or unsupervised participation in a prescribed physical activity programme;
- supervised physical activity in the home;
- supervised physical activity in a facility;
- monitoring device (e.g. accelerometer or pedometer);
- other intervention designed to promote physical activity.

Types of outcome measures

Participation in physical activity is the main focus of this review and measurement of physical activity is an inclusion criterion for the review. However, the authors acknowledge that increases in physical activity may also lead to changes in quality of life, which will be explored as a secondary focus. We will report details of outcome measure assessment where this information is provided.

Primary outcomes

- **Physical activity:** measured by self-report or objectively, using monitoring devices (e.g. accelerometer or pedometer).

Physical activity measures will include: overall physical activity, measured by self-report using standardised questionnaires (e.g. Global Physical Activity Questionnaire); total time spent in physical activity, measured by self-report or objectively (minutes/week); estimated total energy expenditure, measured by self-report or objectively (calories or joules/week); step count, measured objectively (steps/week) (Foster 2005; Foster 2013; Richards 2013a; Richards 2013b).

We will prioritise the inclusion of physical activity outcomes in the following order: overall physical activity > total time spent in

physical activity > estimated total energy expenditure > step count. We will perform subgroup analysis to explore differences in physical activity measured subjectively and objectively.

Secondary outcomes

- **Quality of life:** measured by self-report using standardised questionnaire scales (e.g. Short Form Health Survey (SF-36)).
- **Adverse events:**
  * increase in pain: measured by self-report;
  * any other, emergent and intervention-related;
  * leading to discontinuation from study.
- **Serious adverse events:**
  * hospitalisation;
  * all-cause death.

To avoid potential selection bias, we will only analyse final values where studies do not report change scores. Where feasible, we will make comparisons at the following time points:

- less than six weeks from baseline;
- six weeks to six months from baseline;
- six to 12 months from baseline;
- over 12 months from baseline.

If an included study reports multiple measures for the same outcome, we will include the data for each of these measures. We will base the minimal important difference (MID) for outcomes on established values in the literature where possible. Where MIDs are unavailable, we will report this in the interpretation of the outcomes.

Search methods for identification of studies

Electronic searches

We will identify trials from the Cochrane Neuromuscular Specialised Register, which is maintained by the Information Specialist for the Group. The Information Specialist will search the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, and Embase. The draft search strategies are in Appendix 1, Appendix 2, Appendix 3 and Appendix 4.

We will search the US National Institutes for Health Clinical Trials Registry, ClinicalTrials.gov (www.ClinicalTrials.gov), and the WHO International Clinical Trials Registry Portal (ICTRP) (apps.who.int/trialsearch/) for unpublished and ongoing studies. We will search all databases from their inception to the present, and we will impose no restriction on language of publication.

Searching other resources

We will search reference lists of all included studies and review articles for additional references. We will also search for errata or retractions from included studies.

Data collection and analysis

Selection of studies

Two review authors (KJ and FH) will independently screen titles and abstracts of all the potential studies identified by the search for inclusion and code them as 'retrieve' (eligible or potentially eligible/unclear) or 'do not retrieve' using Covidence (Covidence). We will retrieve the full-text study reports/publications and two review authors (KJ and FH) will independently screen the full text and identify studies for inclusion, and identify and record reasons for exclusion of the ineligible studies. We will resolve any disagreement through discussion or, if required, we will consult a third person (GR). We will identify and exclude duplicates and collate multiple reports of the same study so that each study rather than each report is the unit of interest in the review. We will record the selection process in sufficient detail to complete a PRISMA flow diagram, 'Characteristics of included studies' table, and 'Characteristics of excluded studies' table.

Data extraction and management

We will use a data extraction form for study characteristics and outcome data which has been piloted on at least one study in the review. We will apply the TIDieR Checklist (Template for intervention Description and Replication; The EQUATOR Network). We will also consider other intervention-reporting guidance, including the CERT framework (Consensus on Exercise Reporting Template; Slade 2016) and MARS (Mobile App Rating Scale; Stoyanov 2015). One review author (KJ) will extract the following study characteristics from included studies: study design and setting, characteristics of participants (e.g. disease severity and age), eligibility criteria, intervention details, outcomes assessed, source(s) of study funding, and any conflicts of interest among investigators.

Two review authors (KJ and FH, JN, JM, or DGJ) will extract outcome data from included studies and transfer data into Review Manager 5 (Review Manager 2014). We will note in the 'Characteristics of included studies' table if outcome data were not reported in a usable way. We will resolve any disagreements by discussion or by involving another author (GR). A third author (GR) will check the outcome data entries and spot-check study characteristics for accuracy against the trial report.

When reports require translation, the translator will extract data directly using a data extraction form, or authors will extract data from the translation provided. Where possible a review author will check numerical data in the translation against the study report.

Assessment of risk of bias in included studies

Two review authors (KJ and JN) will independently assess risk of bias for each outcome using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011b). We will resolve any disagreements by discussion or by involving another author (JM). If a review author has involvement in any potential included studies, a third co-author will complete the assessment instead. We will assess the risk of bias according to the following domains:

- random sequence generation;
- allocation concealment;
- blinding of participants and personnel;
- blinding of outcome assessment;
- incomplete outcome data;
- selective outcome reporting;
- other bias.

We will grade each potential source of bias as high, low, or unclear risk and provide a quote from the study report together with a justification for our judgement in the 'Risk of bias' table. We will

summarise the risk of bias judgements across different studies for each of the domains listed; we will consider all outcomes separately as some domains may have different risks of bias for different outcomes. Where information on risk of bias relates to unpublished data or correspondence with a trialist, we will note this in the 'Risk of bias' table.

When considering treatment effects, we will take into account the risk of bias for the evidence that contributes to that outcome.

Assessment of bias in conducting the systematic review

We will conduct the review according to this published protocol and report any deviations from it in the 'Differences between protocol and review' section of the systematic review.

Measures of treatment effect

The effect of interest in this review is the effect of assignment to the intervention rather than adherence, which is a different review question. We will therefore limit our meta-analysis to the intention-to-treat population.

Dichotomous data

We will analyse dichotomous data as risk ratios (RR) with 95% confidence intervals (CIs) except for rare events (zero in either arm or less than 1%), in which case we will use the Peto odds ratio (Peto OR) with 95% CIs. To assess absolute risk where there are zero events in the control arm, we will calculate the risk difference (RD) with 95% CIs in Review Manager 5 (Review Manager 2014).

Continuous data

We will analyse continuous data as mean difference (MD) with 95% CIs, or standardised mean difference (SMD) with 95% CIs for results across studies with outcomes that are conceptually the same but measured in different ways (including physical activity questionnaires and health-related quality of life questionnaires). Where necessary, we will combine final values and change scores in the same analysis if reporting the MD but not when reporting the SMD. We will enter data presented as a scale with a consistent direction of effect.

We will use the Mantel-Haenszel (M-H) or Peto method to meta-analyse dichotomous data, and the inverse variance (IV) method to meta-analyse continuous data. We will undertake meta-analyses only where this is meaningful (i.e. if the treatments, participants, and underlying clinical question are similar enough for pooling to make sense).

Unit of analysis issues

Multiple arm studies

Where multiple trial arms are reported in a single trial, we will only include arms eligible for this review (although we will list additional arms in the 'Characteristics of included studies' table). If two comparisons (e.g. intervention A versus intervention C and intervention B versus intervention C) are included in the same meta-analysis, we will avoid double-counting by combining groups to create a single pair-wise comparison (Higgins 2011a). If the review includes more than one comparison that cannot be included in the same analysis, we will report the results for each comparison separately.

Cross-over studies

As there may be carry-over in the effect of physical activity promotion and a period effect in some neuromuscular conditions, we will only include first-period data from cross-over studies. Where possible, we will perform a Sensitivity analysis to examine the effect of excluding first-period cross-over data from meta-analyses (Higgins 2011a).

Cluster randomised controlled trials

We do not expect any eligible studies will be cluster RCTs; if we find any, we will discuss these narratively in the review.

Within-patient trial designs

We do not expect any eligible studies will use within-patient trial designs; if we find any, we will discuss these narratively in the review.

Dealing with missing data

We will contact investigators or study sponsors to verify key study characteristics and obtain relevant missing numerical outcome data where possible (e.g. when a study is available as an abstract only). If missing data are thought to introduce serious bias, we will explore the impact of including such studies in the overall assessment of results using a Sensitivity analysis.

Assessment of heterogeneity

We will use the I^2 statistic to measure heterogeneity among the trials in each analysis. We will use the rough guide to interpretation as outlined in Chapter 11 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Deeks 2011), as follows:

- 0% to 40%: might not be important;
- 30% to 60%: may represent moderate heterogeneity;
- 50% to 90%: may represent substantial heterogeneity;
- 75% to 100%: considerable heterogeneity.

We will also consider the following factors: the overlap of CIs in forest plots, whereby poor overlap is expected to indicate heterogeneity; the Chi^2 test included in forest plots, for which a large result relative to the degrees of freedom is expected to indicate heterogeneity; a low P value for heterogeneity (less than 0.10) in forest plots.

If we identify substantial unexplained heterogeneity, we will report it and explore possible causes narratively and by prespecified subgroup analysis.

Assessment of reporting biases

We note that small-study effects can bias results even in the absence of heterogeneity. If we are able to pool more than 10 trials, we will create and examine a funnel plot to explore possible small-study biases; we will use the 'trim and fill' method to investigate publication bias, as detailed in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011c).

Data synthesis

We will use a random-effects model in Review Manager 5 (Review Manager 2014), on the assumption that different studies are estimating different, yet related, intervention effects (Deeks 2011).

We will perform a Sensitivity analysis with the fixed-effect model and report the results for both models unless the estimate of the between-study variance is very close to zero..

'Summary of findings' table

We will create a 'Summary of findings' table using GRADEpro GDT software (GRADEpro GDT), and present the following outcomes.

- Physical activity: overall physical activity measured by self-report, using standardised questionnaires (e.g. Global Physical Activity Questionnaire) at less than six weeks from baseline.
- Physical activity: overall physical activity measured by self-report using standardised questionnaires (e.g. Global Physical Activity Questionnaire) at six weeks to six months from baseline.
- Physical activity: total time spent in physical activity measured by self-reported minutes/week at less than six weeks from baseline.
- Physical activity: total time spent in physical activity measured by self-reported minutes/week at six weeks to six months from baseline.
- Quality of life: measured by self-report using standardised questionnaire scales (e.g. SF-36) at less than six weeks from baseline.
- Quality of life: measured by self-report using standardised questionnaire scales (e.g. SF-36) at six weeks to six months from baseline.
- Adverse events leading to discontinuation from study.

We will present results for the main comparisons of this review, using one 'Summary of findings table' for each comparison. Physical activity parameters are the primary outcome of interest for assessing the effect of interventions to promote physical activity. In addition, we will include well-being and safety aspects, which could influence intervention uptake and adherence across a spectrum of NMD. We will prioritise standardised, self-reported outcome measurement and time points that will include both very brief interventions and short to medium length programmes of physical activity promotion. Two review authors (KJ and JN) will use the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness, and publication bias) to independently assess the certainty of a body of evidence (studies that contribute data for the prespecified outcomes). We will use methods and recommendations described in Chapters 11 and 12 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Schünemann 2011a; Schünemann 2011b). We will resolve any disagreements by discussion or by involving another author (JM). If a review author has involvement in any potential included studies, a third person will complete the assessment instead. We will consider outcomes to have high-certainty evidence if the five factors above are not present to any serious degree, but may downgrade the certainty to moderate, low, or very low. We will downgrade evidence once if a GRADE consideration is serious and twice if very serious. We will justify all decisions to downgrade or upgrade the certainty of the evidence using footnotes and make comments to aid readers' understanding of the review where necessary. We will use a median control group risk across studies but also report the second highest and second lowest control group risks as representative rates for assumed risk per row of the table (i.e. low-, moderate-, and high-risk populations) where there is potentially important variation. We will provide a source or rationale and corresponding time duration for the control group risk, indicating the types of participants in which this might apply. In the absence of meta-analyses, we will include narratively synthesised evidence within the 'Summary of findings' table.

Subgroup analysis and investigation of heterogeneity

We plan to carry out the following subgroup analyses to investigate clinically plausible differences in the intervention effect (Deeks 2011):

- in different types of NMD, including muscle disease, peripheral nerve disorders, neuromuscular junction disorders, and motor neuron disorders (analysis 1);
- adults (aged 18 years or older) versus children (aged less than 18 years) versus mixed adults and children (analysis 2);
- ambulatory (independent walking and occasional use of an assistive device) versus non-ambulatory (habitual use of an assistive device or wheelchair) versus mixed ambulatory and non-ambulatory (analysis 3);
- regular supervisory support (operational definition: at least two scheduled sessions with identified personnel to plan and progress activity) versus no regular supervisory support (analysis 4);
- general health visit versus other intervention designed to promote physical activity (analysis 5);
- subjectively measured physical activity versus objectively measured physical activity (analysis 6).

We will use the following primary outcomes in subgroup analyses.

- Overall physical activity, measured by self-report using standardised questionnaires (e.g. Global Physical Activity Questionnaire).
- Total time spent in physical activity, measured by self-report or objectively (minutes/week).
- Estimated total energy expenditure, measured by self-report or objectively (calories or joules/week).
- Step count, measured objectively (steps/week).

For subgroup analyses 1 to 4, we will prioritise the inclusion of physical activity outcomes using the order above. For the fifth subgroup analysis, we will only include comparable measures of physical activity (total time; total energy expenditure).

We will use the formal test for subgroup differences in Review Manager 5 (Review Manager 2014). Overlap of CIs and a high I^2 statistic will indicate a difference between subgroups, and suggest there could be differential effects of interventions to promote physical activity in different types of NMD.

Sensitivity analysis

We plan to carry out the following sensitivity analyses to investigate the robustness of findings to the decisions made in obtaining them (Deeks 2011).

- Repeat the analysis excluding unpublished studies (if there are any).
- Repeat the analysis excluding studies that do not describe diagnostic criteria for NMDs.
- Repeat the analysis excluding studies at high risk of bias for missing data.

- Repeat the analysis excluding the data from cross-over studies.
- Repeat the analysis using a fixed-effect model.

Reaching conclusions

We will base our conclusions only on findings from the quantitative or narrative synthesis of included studies for this review. We will avoid making recommendations for practice and our implications for research will suggest priorities for future research and outline what the remaining uncertainties are in the area.

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APPENDICES

Appendix 1. Cochrane Neuromuscular Specialised Register (CRSWeb) search strategy

#1 MESH DESCRIPTOR Neuromuscular Diseases AND INREGISTER
#2 MESH DESCRIPTOR Muscular Atrophy AND INREGISTER
#3 MESH DESCRIPTOR Muscular Dystrophies EXPLODE ALL AND INREGISTER
#4 MESH DESCRIPTOR Myositis AND INREGISTER
#5 MESH DESCRIPTOR Myotonia AND INREGISTER
#6 (myastheni* or (lambert and eaton and syndrome*)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#7 MESH DESCRIPTOR Peripheral Nervous System Diseases AND INREGISTER
#8 MESH DESCRIPTOR Polyneuropathies EXPLODE ALL AND INREGISTER
#9 MESH DESCRIPTOR Peripheral Nerves AND INREGISTER
#10 MESH DESCRIPTOR Neuritis AND INREGISTER
#11 MESH DESCRIPTOR Neuromuscular Junction Diseases AND INREGISTER
#12 MESH DESCRIPTOR Motor Neuron Disease EXPLODE ALL AND INREGISTER
#13 MeSH DESCRIPTOR Motor Neuron Disease Explode All AND INREGISTER
#14 "motor neuron disease*" or "motor neurone disease*" AND INREGISTER
#15 "motoneuron disease*" or "motoneurone disease*" AND INREGISTER
#16 "motorneuron disease*" or "motorneurone disease*" AND INREGISTER
#17 "charcot disease" AND INREGISTER
#18 "amyotrophic lateral sclerosis" AND INREGISTER
#19 als:ti or als:ab or mnd:ti or mnd:ab AND INREGISTER
#20 MESH DESCRIPTOR Glycogen Storage Disease Type V AND INREGISTER
#21 (McArdle* or "Glycogen Storage Disease Type V" or "Glycogen Storage Disease Type 5" or GSDV or "muscle phosphorylase" deficiency or myophosphorylase):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#22 MESH DESCRIPTOR Glycogen Phosphorylase, Muscle Form AND INREGISTER
#23 ("Glycogen Phosphorylase" NEAR3 "Muscle Form"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#24 MESH DESCRIPTOR Muscular Diseases EXPLODE ALL AND INREGISTER
#25 ("muscle disease*" or "muscle disorder*" or "muscular disease*" or "muscular disorder*" or "neuromuscular disease*" or "neuromuscular disorder*" or myopath* or dystroph* or myotoni* or myositis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#26 (myopathy or "muscle fibre" or "muscle fiber"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#27 ("muscular dystroph*" or "muscular atrophy" or myositis or myotonia):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#28 ("peripheral neuropath*" or polyneuropath* or "peripheral nerve*"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#29 (neuritis or polyradiculopathy or polyradiculoneuropathy or polyradiculoneuritis or polyneuritis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#30 ("neuromuscular junction" NEAR3 (disease or diseases or disorder or disorders)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#31 MESH DESCRIPTOR paraproteinemias AND INREGISTER
#32 MESH DESCRIPTOR alcoholism AND INREGISTER
#33 MESH DESCRIPTOR Paraneoplastic Syndromes AND INREGISTER
#34 MESH DESCRIPTOR Paraneoplastic Syndromes, Nervous System AND INREGISTER
#35 MESH DESCRIPTOR Pain EXPLODE ALL AND INREGISTER
#36 (pain or painful or chemically or toxicity):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#37 #31 OR #32 OR #33 OR #34 OR #35 OR #36 AND INREGISTER
#38 MESH DESCRIPTOR Peripheral Nervous System Diseases AND INREGISTER
#39 (neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#40 #38 OR #39 AND INREGISTER
#41 #37 AND #40 AND INREGISTER
#42 (demyelin*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#43 (Inflammatory NEAR2 (polyradiculoneuropath* or polyneuropath* or mononeuropath*)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#44 #42 AND #43 AND INREGISTER
#45 MESH DESCRIPTOR Polyradiculoneuropathy AND INREGISTER

#46 (polyradiculoneuritis or (guillain NEAR2 barre)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#47 MESH DESCRIPTOR Polyradiculoneuropathy, Chronic Inflammatory Demyelinating AND INREGISTER
#48 ("chronic inflammatory demyelinating polyradiculoneuropathy"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#49 (multifocal NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#50 (paraprot* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#51 MESH DESCRIPTOR POEMS Syndrome AND INREGISTER
#52 (poems NEAR2 syndrome):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#53 MESH DESCRIPTOR Amyloid Neuropathies EXPLODE ALL AND INREGISTER
#54 (amyloid NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#55 MESH DESCRIPTOR Hereditary Sensory and Motor Neuropathy AND INREGISTER
#56 MESH DESCRIPTOR Hereditary Sensory and Autonomic Neuropathies AND INREGISTER
#57 (hereditary NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#58 (toxic NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#59 (("drug induced" or "chemically induced") NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#60 (alcohol* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#61 (borrelia*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#62 (herpes NEAR zoster):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#63 (diabetic NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#64 (vasculiti* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#65 (Brachial NEAR neuritis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#66 (neuralgic NEAR amyotroph*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#67 (radiation NEAR plexopath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#68 MESH DESCRIPTOR Brachial Plexus Neuropathies EXPLODE ALL AND INREGISTER
#69 ("cervical spondylotic radiculopath*"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#70 (lumbosacral near radiculopath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#71 (Bell* NEAR pals*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#72 MESH DESCRIPTOR Facial Paralysis AND INREGISTER
#73 #72 AND pals*:AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#74 ("cranial nerve*" NEAR pals*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#75 (trigeminal NEAR neuralgia):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#76 MESH DESCRIPTOR Peripheral Nervous System Neoplasms AND INREGISTER
#77 MESH DESCRIPTOR Peripheral Nervous System Neoplasms EXPLODE ALL AND INREGISTER
#78 MESH DESCRIPTOR Neuralgia AND INREGISTER
#79 #78 and (herpes or herpetic):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#80 MESH DESCRIPTOR Neuritis AND INREGISTER
#81 MESH DESCRIPTOR Brachial Plexus AND INREGISTER
#82 #80 AND #81 AND INREGISTER
#83 MESH DESCRIPTOR Peripheral Nervous System Diseases WITH QUALIFIER RH AND INREGISTER
#84 #1 OR #2 OR #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 OR #28 OR #29 OR #30 OR #41 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70 OR #71 OR #73 OR #74 OR #75 OR #76 OR #77 OR #79 OR #82 OR #83 AND INREGISTER
#85 "circuit based exercise" AND INREGISTER
#86 MESH DESCRIPTOR exercise therapy EXPLODE ALL AND INREGISTER
#87 MESH DESCRIPTOR Physical Education and Training AND INREGISTER
#88 MESH DESCRIPTOR Sports AND INREGISTER
#89 MESH DESCRIPTOR exercise AND INREGISTER
#90 (aerobic NEAR3 exercise) or (aerobic NEAR3 training) or aerobics AND INREGISTER
#91 "ambulatory care" or "behaviour therapy" or "behavior therapy" AND INREGISTER
#92 "circuit training" or "cognitive therapy" or cycling or dance or dancing AND INREGISTER
#93 "endurance exercise* or endurance training" or "exercise therapy" or "exercise training" or "exercise program*" AND INREGISTER
#94 physical* NEAR5 (fit* or train* or activ* or endur* or exertion) AND INREGISTER
#95 "activity tracking" or pedometer or pedometry or accelerometer or accelerometry AND INREGISTER
#96 "muscle exercise" or "excessive training" AND INREGISTER
#97 "fitness training" or "functional activity" or "physical education" AND INREGISTER
#98 gait or "health training" or "health promotion" or "activities of daily living" or "patient education" AND INREGISTER
#99 jog or jogging or running or kinesiotherapy or lifestyle or "life style" AND INREGISTER
#100 MESH DESCRIPTOR Physical Therapy Modalities EXPLODE ALL AND INREGISTER
#101 "physical therapy" or physiotherapy or "physical train*" AND INREGISTER
#102 "resistive exercise" or "resistive training" or rowing or swim or swimming AND INREGISTER
#103 "strength training" or "resistive exercise raining" or "weight training" AND INREGISTER
#104 "training program" or "training programme" or treadmill or bicycle or yoga AND INREGISTER

#105 MESH DESCRIPTOR Health Education AND INREGISTER
#106 MESH DESCRIPTOR Primary Prevention AND INREGISTER
#107 MESH DESCRIPTOR Health Promotion AND INREGISTER
#108 MESH DESCRIPTOR Cognitive Therapy AND INREGISTER
#109 MESH DESCRIPTOR Primary Health Care AND INREGISTER
#110 MESH DESCRIPTOR Workplace AND INREGISTER
#111 promot* NEAR3 (health or activity or exercise) AND INREGISTER
#112 educat* NEAR3 (health or activity or exercise) AND INREGISTER
#113 rehabilitation AND INREGISTER
#114 therapy NEAR2 (pool or aqua or aquatic or equine of riding) AND INREGISTER
#115 therapies NEAR2 (pool or aqua or aquatic or equine of riding) AND INREGISTER
#116 hydrotherapy or horseback or "wheelchair sport*" or "video gam*" AND INREGISTER
#117 #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116 AND INREGISTER
#118 #117 AND #84 AND INREGISTER
#119 ("carpal tunnel" or fibromyalgia or sciatica or "low back pain" or "chronic fatigue syndrome"):ti AND INREGISTER
#120 "respiratory muscle" or "pelvic floor" AND INREGISTER
#121 #118 NOT (#119 or #120) AND INREGISTER

Appendix 2. CENTRAL (CRSWeb) search strategy

#1 MESH DESCRIPTOR Neuromuscular Diseases AND INREGISTER
#2 MESH DESCRIPTOR Muscular Atrophy AND INREGISTER
#3 MESH DESCRIPTOR Muscular Dystrophies EXPLODE ALL AND INREGISTER
#4 MESH DESCRIPTOR Myositis AND INREGISTER
#5 MESH DESCRIPTOR Myotonia AND INREGISTER
#6 (myastheni* or (lambert and eaton and syndrome*)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#7 MESH DESCRIPTOR Peripheral Nervous System Diseases AND INREGISTER
#8 MESH DESCRIPTOR Polyneuropathies EXPLODE ALL AND INREGISTER
#9 MESH DESCRIPTOR Peripheral Nerves AND INREGISTER
#10 MESH DESCRIPTOR Neuritis AND INREGISTER
#11 MESH DESCRIPTOR Neuromuscular Junction Diseases AND INREGISTER
#12 MESH DESCRIPTOR Motor Neuron Disease EXPLODE ALL AND INREGISTER
#13 MeSH DESCRIPTOR Motor Neuron Disease Explode All AND INREGISTER
#14 "motor neuron disease*" or "motor neurone disease*" AND INREGISTER
#15 "motoneuron disease*" or "motoneurone disease*" AND INREGISTER
#16 "motorneuron disease*" or "motorneurone disease*" AND INREGISTER
#17 "charcot disease" AND INREGISTER
#18 "amyotrophic lateral sclerosis" AND INREGISTER
#19 als:ti or als:ab or mnd:ti or mnd:ab AND INREGISTER
#20 MESH DESCRIPTOR Glycogen Storage Disease Type V AND INREGISTER
#21 (McArdle* or "Glycogen Storage Disease Type V" or "Glycogen Storage Disease Type 5" or GSDV or "muscle phosphorylase" deficiency or myophosphorylase):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#22 MESH DESCRIPTOR Glycogen Phosphorylase, Muscle Form AND INREGISTER
#23 ("Glycogen Phosphorylase" NEAR3 "Muscle Form"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#24 MESH DESCRIPTOR Muscular Diseases EXPLODE ALL AND INREGISTER
#25 ("muscle disease*" or "muscle disorder*" or "muscular disease*" or "muscular disorder*" or "neuromuscular disease*" or "neuromuscular disorder*" or myopath* or dystroph* or myotoni* or myositis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#26 (myopathy or "muscle fibre" or "muscle fiber"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#27 ("muscular dystroph*" or "muscular atrophy" or myositis or myotonia):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#28 ("peripheral neuropath*" or polyneuropath* or "peripheral nerve*"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#29 (neuritis or polyradiculopathy or polyradiculoneuropathy or polyradiculoneuritis or polyneuritis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#30 ("neuromuscular junction" NEAR3 (disease or diseases or disorder or disorders)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#31 MESH DESCRIPTOR paraproteinemias AND INREGISTER
#32 MESH DESCRIPTOR alcoholism AND INREGISTER
#33 MESH DESCRIPTOR Paraneoplastic Syndromes AND INREGISTER
#34 MESH DESCRIPTOR Paraneoplastic Syndromes, Nervous System AND INREGISTER
#35 MESH DESCRIPTOR Pain EXPLODE ALL AND INREGISTER
#36 (pain or painful or chemically or toxicity):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#37 #31 OR #32 OR #33 OR #34 OR #35 OR #36 AND CENTRAL:TARGET
#38 MESH DESCRIPTOR Peripheral Nervous System Diseases AND INREGISTER

#39 (neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#40 #38 OR #39 AND CENTRAL:TARGET
#41 #37 AND #40 AND CENTRAL:TARGET
#42 (demyelin*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#43 (Inflammatory NEAR2 (polyradiculoneuropath* or polyneuropath* or mononeuropath*)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#44 #42 AND #43 AND CENTRAL:TARGET
#45 MESH DESCRIPTOR Polyradiculoneuropathy AND INREGISTER
#46 (polyradiculoneuritis or (guillain NEAR2 barre)):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#47 MESH DESCRIPTOR Polyradiculoneuropathy, Chronic Inflammatory Demyelinating AND INREGISTER
#48 ("chronic inflammatory demyelinating polyradiculoneuropathy"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#49 (multifocal NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#50 (paraprot* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#51 MESH DESCRIPTOR POEMS Syndrome AND INREGISTER
#52 (poems NEAR2 syndrome):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#53 MESH DESCRIPTOR Amyloid Neuropathies EXPLODE ALL AND INREGISTER
#54 (amyloid NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#55 MESH DESCRIPTOR Hereditary Sensory and Motor Neuropathy AND INREGISTER
#56 MESH DESCRIPTOR Hereditary Sensory and Autonomic Neuropathies AND INREGISTER
#57 (hereditary NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#58 (toxic NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#59 (("drug induced" or "chemically induced") NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#60 (alcohol* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#61 (borrelia*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#62 (herpes NEAR zoster):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#63 (diabetic NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#64 (vasculiti* NEAR neuropath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#65 (Brachial NEAR neuritis):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#66 (neuralgic NEAR amyotroph*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#67 (radiation NEAR plexopath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#68 MESH DESCRIPTOR Brachial Plexus Neuropathies EXPLODE ALL AND INREGISTER
#69 ("cervical spondylotic radiculopath*"):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#70 (lumbosacral near radiculopath*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#71 (Bell* NEAR pals*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#72 MESH DESCRIPTOR Facial Paralysis AND INREGISTER
#73 #72 AND pals*:AB,EH,EMT,KW,KY,MH,TI AND CENTRAL:TARGET
#74 ("cranial nerve*" NEAR pals*):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#75 (trigeminal NEAR neuralgia):AB,EH,EMT,KW,KY,MH,TI AND INREGISTER
#76 MESH DESCRIPTOR Peripheral Nervous System Neoplasms AND INREGISTER
#77 MESH DESCRIPTOR Peripheral Nervous System Neoplasms EXPLODE ALL AND INREGISTER
#78 MESH DESCRIPTOR Neuralgia AND INREGISTER
#79 #78 and (herpes or herpetic):AB,EH,EMT,KW,KY,MH,TI AND CENTRAL:TARGET
#80 MESH DESCRIPTOR Neuritis AND INREGISTER
#81 MESH DESCRIPTOR Brachial Plexus AND INREGISTER
#82 #80 AND #81 AND CENTRAL:TARGET
#83 MESH DESCRIPTOR Peripheral Nervous System Diseases WITH QUALIFIER RH AND INREGISTER
#84 #1 OR #2 OR #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 OR #28 OR #29 OR #30 OR #41 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 OR #61 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68 OR #69 OR #70 OR #71 OR #73 OR #74 OR #75 OR #76 OR #77 OR #79 OR #82 OR #83 AND CENTRAL:TARGET
#85 "circuit based exercise" AND INREGISTER
#86 MESH DESCRIPTOR exercise therapy EXPLODE ALL AND INREGISTER
#87 MESH DESCRIPTOR Physical Education and Training AND INREGISTER
#88 MESH DESCRIPTOR Sports AND INREGISTER
#89 MESH DESCRIPTOR exercise AND INREGISTER
#90 (aerobic NEAR3 exercise) or (aerobic NEAR3 training) or aerobics AND INREGISTER
#91 "ambulatory care" or "behaviour therapy" or "behavior therapy" AND INREGISTER
#92 "circuit training" or "cognitive therapy" or cycling or dance or dancing AND INREGISTER
#93 "endurance exercise* or endurance training" or "exercise therapy" or "exercise training" or "exercise program*" AND INREGISTER
#94 physical* NEAR5 (fit* or train* or activ* or endur* or exertion) AND INREGISTER
#95 "activity tracking" or pedometer or pedometry or accelerometer or accelerometry AND INREGISTER
#96 "muscle exercise" or "excessive training" AND INREGISTER
#97 "fitness training" or "functional activity" or "physical education" AND INREGISTER

#98 gait or "health training" or "health promotion" or "activities of daily living" or "patient education" AND INREGISTER
#99 jog or jogging or running or kinesiotherapy or lifestyle or "life style" AND INREGISTER
#100 MESH DESCRIPTOR Physical Therapy Modalities EXPLODE ALL AND INREGISTER
#101 "physical therapy" or physiotherapy or "physical train*" AND INREGISTER
#102 "resistive exercise" or "resistive training" or rowing or swim or swimming AND INREGISTER
#103 "strength training" or "resistive exercise raining" or "weight training" AND INREGISTER
#104 "training program" or "training programme" or treadmill or bicycle or yoga AND INREGISTER
#105 MESH DESCRIPTOR Health Education AND INREGISTER
#106 MESH DESCRIPTOR Primary Prevention AND INREGISTER
#107 MESH DESCRIPTOR Health Promotion AND INREGISTER
#108 MESH DESCRIPTOR Cognitive Therapy AND INREGISTER
#109 MESH DESCRIPTOR Primary Health Care AND INREGISTER
#110 MESH DESCRIPTOR Workplace AND INREGISTER
#111 promot* NEAR3 (health or activity or exercise) AND INREGISTER
#112 educat* NEAR3 (health or activity or exercise) AND INREGISTER
#113 rehabilitation AND INREGISTER
#114 therapy NEAR2 (pool or aqua or aquatic or equine of riding) AND INREGISTER
#115 therapies NEAR2 (pool or aqua or aquatic or equine of riding) AND INREGISTER
#116 hydrotherapy or horseback or "wheelchair sport*" or "video gam*" AND INREGISTER
#117 #85 OR #86 OR #87 OR #88 OR #89 OR #90 OR #91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108 OR #109 OR #110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116 AND INREGISTER
#118 #117 AND #84 AND CENTRAL:TARGET
#119 ("carpal tunnel" or fibromyalgia or sciatica or "low back pain" or "chronic fatigue syndrome"):ti AND INREGISTER
#120 "respiratory muscle" or "pelvic floor" AND CENTRAL:TARGET
#121 #118 NOT (#119 or #120) AND CENTRAL:TARGET
#122 #19 AND #121

Appendix 3. MEDLINE (OvidSP) search strategy

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily <1946 to 30 September 2019>
Search strategy:
---
1 randomized controlled trial.pt. (490332)
2 controlled clinical trial.pt. (93274)
3 randomi#ed.ti,ab. (586626)
4 placebo.ab. (200983)
5 randomly.ab. (318863)
6 trial.ab. (477850)
7 groups.ab. (1958131)
8 or/1-7 (2856204)
9 exp animals/ not humans.sh. (4620140)
10 8 not 9 (2426586)
11 Neuromuscular Diseases/ (9974)
12 Muscular Atrophy/ (10584)
13 exp Muscular Dystrophies/ (25746)
14 Myositis/ (7956)
15 Myotonia/ (1170)
16 (myastheni* or (lambert and eaton and syndrome*)).mp. (19601)
17 Peripheral Nervous System Diseases/ (22338)
18 exp Polyneuropathies/ (26641)
19 Peripheral Nerves/ (22709)
20 Neuritis/ (4964)
21 Neuromuscular Junction Diseases/ (196)
22 exp Motor Neuron Disease/ (26420)
23 (moto*1 neuron*1 disease*1 or moto?neuron*1 disease*1).mp. (8756)
24 (amyotrophic lateral sclerosis or charcot disease).tw. (21549)
25 Glycogen Storage Disease Type V/ (623)
26 (McArdle* or Glycogen Storage Disease Type V or Glycogen Storage Disease Type 5 or GSDV or muscle phosphorylase deficiency or myophosphorylase).mp. (1015)
27 Glycogen Phosphorylase, Muscle Form/ (317)
28 (Glycogen Phosphorylase adj3 Muscle Form).tw. (4)
29 exp Muscular Diseases/ (167711)

30 (muscle disease* or muscle disorder* or muscular disease* or muscular disorder* or neuromuscular disease* or neuromuscular disorder* or myopath* or dystroph* or myotoni* or myositis).mp. (132974)
31 (myopathy or muscle fibre or muscle fiber).mp. (32636)
32 (muscular dystroph* or muscular atrophy or myositis or myotonia).mp. (62751)
33 (peripheral neuropath* or polyneuropath* or peripheral nerve*).tw. (67140)
34 (neuritis or polyradiculopathy or polyradiculoneuropathy or polyradiculoneuritis or polyneuritis).mp. (25964)
35 (neuromuscular junction adj3 (disease*1 or disorder*1)).tw. (386)
36 paraproteinemias/ or alcoholism/ or Paraneoplastic Syndromes/ or exp pain/ or (pain or painful or chemically or toxicity).tw. (1262716)
37 peripheral Nervous System Diseases/ or neuropath*.mp. (149131)
38 36 and 37 (38283)
39 demyelin*.mp. (35408)
40 (Inflammatory adj2 (polyradiculoneuropath* or polyneuropath* or mononeuropath*)).mp. (3409)
41 39 and 40 (3239)
42 Polyradiculoneuritis.mp. or Polyradiculoneuropathy/ (4084)
43 (guillain and barre).mp. (9841)
44 Polyradiculoneuropathy, Chronic Inflammatory Demyelinating/ or chronic inflammatory demyelinating polyradiculoneuropathy.mp. (1760)
45 (multifocal and neuropath*).mp. (1775)
46 (paraprot* adj neuropath*).mp. (104)
47 POEMS syndrome/ (907)
48 (poems adj syndrome).mp. (1191)
49 amyloid neuropathies/ (565)
50 (amyloid adj neuropath*).mp. (1859)
51 "Hereditary Sensory and Motor Neuropathy"/ (1143)
52 "hereditary sensory and autonomic neuropathies"/ (753)
53 (heredit* and neuropath*).mp. (7047)
54 (toxic adj neuropath*).mp. (293)
55 ((drug induced or chemically induced) and neuropath*).mp. (9115)
56 (alcohol* adj neuropath*).mp. (226)
57 borrelia*.mp. (12389)
58 (herpes adj zoster).mp. (14490)
59 (diabetic adj neuropath*).mp. (17020)
60 (vasculiti* and neuropath*).mp. (1722)
61 (Brachial adj neuritis).mp. (169)
62 (neuralgic and amyotroph*).mp. (457)
63 (radiation and plexopath*).mp. (222)
64 Brachial Plexus Neuritis/ (1466)
65 cervical spondylotic radiculopath*.mp. (129)
66 (lumbosacral adj radiculopath*).mp. (346)
67 (Bell* adj pals*).mp. (2706)
68 facial paralysis/ and pals*.mp. (4337)
69 (cranial nerve* adj pals*).mp. (3036)
70 (trigeminal adj neuralgia).mp. (8191)
71 peripheral nervous system neoplasms/ (4409)
72 neuralgia/ and (herpes or herpetic).mp. (1008)
73 neuritis/ and brachial plexus/ (141)
74 peripheral nervous system diseases/rh (182)
75 or/11-35,38,41-74 (499346)
76 Circuit-Based Exercise/ (47)
77 exp Exercise Therapy/ (47415)
78 exp "Physical education and training"/ (13280)
79 exp Sports/ (174627)
80 exp Exercise/ (183173)
81 ((aerobic adj3 exercise) or (aerobic adj3 training) or aerobics).mp. (13518)
82 (ambulatory care or behavio?r therapy).mp. (96661)
83 (circuit training or cognitive therapy cycling or dance or dancing).mp. (6658)
84 (endurance exercise* or endurance training or exercise therapy or exercise training or exercise program).mp. (61674)
85 (physical* adj5 (fit* or train* or activ* or endur* or exertion*)).tw. (134134)
86 (activity tracking or pedometer or pedometry or accelerometer or accelerometry).tw. (13436)
87 (muscle exercise or excessive training).mp. (731)
88 (physical exertion or fitness training or functional activity or physical education or physical fitness or physical endur*).mp. (124733)
89 (gait or health training or health promotion or activities of daily living or patient education).mp. (308605)

90 (jog or jogging or running or kinesiotherapy or lifestyle or life style or physical activit*).mp. (271435)
91 Physical Therapy Modalities/ or (physical therapy or physiotherapy or physical train*).mp. (65245)
92 (resistive exercise or resistive training or rowing or swim or swimming).mp. (42534)
93 ((strength or resistive exercise or weight) adj training).mp. (5803)
94 (training program or treadmill or bicycle or yoga).mp. (65839)
95 health education/ (59334)
96 patient education/ (82929)
97 primary prevention/ (17791)
98 health promotion/ (70764)
99 cognitive therapy/ (23972)
100 primary health care/ (73544)
101 workplace/ (21234)
102 ((promot* or educat*) adj3 (health or activity or exercise)).tw. (150611)
103 rehabilitation.tw. (148320)
104 ((pool or aqua or aquatic or equine or riding) adj2 therap*3).mp. (577)
105 (hydrotherapy or horseback or wheelchair sport*1 or video gam*3).mp. (9858)
106 or/76-105 (1362867)
107 10 and 75 and 106 (7433)
108 (respiratory muscle or pelvic floor or incontinence).mp. (66950)
109 108 or (carpal tunnel or fibromyalgia or sciatica or low back pain).ti. (95614)
110 107 not 109 (6697)
111 110 and medline.st. (6347)
112 limit 111 to yr="2010 -Current" (3556)
113 remove duplicates from 112 (3543)
114 111 not 112 (2791)
115 remove duplicates from 114 (2786)
116 113 or 115 (6329)
117 (review or systematic review or case reports).pt. (4499391)
118 116 not 117 (5475)

Appendix 4. Embase (OvidSP) search strategy

Database: Embase Classic + Embase <1947 to 2019 September 30>
Search strategy:
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1 crossover-procedure.sh. (61432)
2 double-blind procedure.sh. (169348)
3 single-blind procedure.sh. (36877)
4 randomized controlled trial.sh. (576869)
5 (random* or crossover* or cross over* or placebo* or (doubl* adj blind*) or allocat*).tw,ot. (1720485)
6 trial.ti. (291386)
7 controlled clinical trial/ (465990)
8 or/1-7 (2050157)
9 exp animal/ or exp invertebrate/ or animal.hw. or non human/ or nonhuman/ (28687665)
10 human/ or human cell/ or human tissue/ or normal human/ (21627042)
11 9 not 10 (7126132)
12 8 not 11 (1822192)
13 limit 12 to (conference abstracts or embase) (1538326)
14 neuromuscular disease/ (16817)
15 muscle atrophy/ (34459)
16 exp muscular dystrophy/ (48773)
17 myositis/ (16284)
18 inclusion body myositis/ (2456)
19 myotonia/ (3255)
20 (myastheni* or (lambert and eaton and syndrome*)).mp. (31155)
21 peripheral neuropathy/ (46580)
22 exp polyneuropathy/ (41227)
23 peripheral nerve/ (27050)
24 neuritis/ (10318)
25 neuromuscular junction disorder/ (996)
26 exp motor neuron disease/ (45374)
27 (moto*1 neuron*1 disease*1 or moto?neuron*1 disease*1).mp. (14098)

28 (amyotrophic lateral sclerosis or charcot disease).tw. (30231)
29 glycogen storage disease/ or glycogen storage disease type 5/ (5104)
30 (McArdle* or Glycogen Storage Disease Type V or Glycogen Storage Disease Type 5 or GSDV or muscle phosphorylase deficiency or myophosphorylase).mp. (1604)
31 glycogen phosphorylase/ (3644)
32 (Glycogen Phosphorylase adj3 Muscle Form).tw. (4)
33 exp muscle disease/ (533904)
34 (muscle disease* or muscle disorder* or muscular disease* or muscular disorder* or neuromuscular disease* or neuromuscular disorder* or myopath* or dystroph* or myotoni* or myositis).mp. (196060)
35 (myopathy or muscle fibre or muscle fiber).mp. (122669)
36 (muscular dystroph* or muscular atrophy or myositis or myotonia).mp. (85214)
37 (peripheral neuropath* or polyneuropath* or peripheral nerve*).tw. (99229)
38 (neuritis or polyradiculopathy or polyradiculoneuropathy or polyradiculoneuritis or polyneuritis).mp. (33432)
39 (neuromuscular junction adj3 (disease*1 or disorder*1)).tw. (706)
40 paraproteinemia/ or alcoholism/ or paraneoplastic syndrome/ or exp pain/ or (pain or painful or chemically or toxicity).tw. (2311453)
41 peripheral neuropathy/ or neuropath*.mp. (317177)
42 40 and 41 (100503)
43 demyelin*.mp. (61978)
44 (Inflammatory adj (polyradiculoneuropath* or polyneuropath* or mononeuropath*)).mp. (437)
45 43 and 44 (218)
46 polyradiculoneuropathy/ (2890)
47 neuritis/ (10318)
48 polyradiculoneuritis.tw. (979)
49 (guillain and barre).mp. (18584)
50 chronic inflammatory demyelinating polyradiculoneuropathy.mp. (1444)
51 (multifocal and neuropath*).mp. (3904)
52 (paraprot* adj neuropath*).mp. (174)
53 POEMS syndrome/ (1228)
54 (poems adj syndrome).mp. (1767)
55 amyloid neuropathy/ (1376)
56 (amyloid adj (neuropath* or polyneuropath)).mp. (1638)
57 hereditary motor sensory neuropathy/ (10985)
58 (heredit* and neuropath*).mp. (20238)
59 (toxic adj neuropath*).mp. (475)
60 ((drug induced or chemically induced) and neuropath*).mp. (5415)
61 (alcohol* adj neuropath*).mp. (234)
62 borrelia.mp. (17053)
63 (herpes adj zoster).mp. (29109)
64 (diabetic adj neuropath*).mp. (26918)
65 (vasculiti* and neuropath*).mp. (4852)
66 (brachial adj neuritis).mp. (290)
67 (neuralgic and amyotroph*).mp. (732)
68 (radiation and plexopath*).mp. (431)
69 brachial plexus neuropathy/ (2065)
70 cervical spondylotic radiculopath*.mp. (192)
71 (lumbosacral adj radiculopath*).mp. (532)
72 (Bell* adj pals*).mp. (4936)
73 facial paralysis/ and pals*.mp. (4871)
74 (cranial nerve* adj pals*).mp. (4568)
75 (trigeminal adj neuralgia).mp. (8395)
76 peripheral nerve tumor/ (2251)
77 neuralgia/ and (herpes or herpetic).mp. (936)
78 peripheral neuropathy/rh [Rehabilitation] (135)
79 or/14-39,42,45-78 (962313)
80 exp kinesiotherapy/ (79190)
81 physical education/ (13637)
82 exp sport/ (164753)
83 exp exercise/ (350938)
84 ((aerobic adj3 exercise) or (aerobic adj3 training) or aerobics).mp. (24902)
85 (ambulatory care or behavio?r therapy).mp. (92405)
86 (circuit training or cycling or dance or dancing or walking).mp. (205220)
87 (endurance exercise* or endurance training or exercise therapy or exercise training or exercise program*).mp. (53429)

88 (physical* adj5 (fit* or train* or activ* or endur* or exertion*)).tw. (187502)
89 ((activity adj2 tracking) or pedometer or pedometry or accelerometer or accelerometry).tw. (17846)
90 ((muscle or excess*) adj2 (exercise or training)).mp. (28982)
91 (physical exertion or fitness training or functional activity or physical education or physical fitness or physical endur*).mp. (53012)
92 (gait or health training or health promotion or activities of daily living or patient education).mp. (313216)
93 (jog or jogging or running or kinesiotherapy or lifestyle or life style or physical activit*).mp. (472606)
94 (physical therapy or physiotherapy or physical train*).mp. (119382)
95 (resistive exercise or resistive training or rowing or swim or swimming).mp. (55867)
96 ((strength or resistive exercise or weight) adj2 training).mp. (9129)
97 (training program or treadmill or bicycle or yoga).mp. (110197)
98 health education/ (98761)
99 patient education/ (110264)
100 primary prevention/ (39573)
101 health promotion/ (93938)
102 cognitive therapy/ (43601)
103 primary health care/ (63483)
104 workplace/ (39657)
105 (patient education or primary prevention or workplace or cognitive therapy).tw. (98224)
106 ((promot* or educat*) adj3 (health or activity or exercise)).tw. (184083)
107 rehabilitation.tw. (226845)
108 ((pool or aqua or equine or riding) adj2 therap*3).mp. (441)
109 (hydrotherapy or horseback or wheelchair sport*1 or video gam*3).mp. (12275)
110 or/80-109 (1997026)
111 13 and 79 and 110 (8460)
112 (respiratory muscle or pelvic floor or incontinence).mp. (125768)
113 112 or (carpal tunnel or fibromyalgia or sciatica or low back pain).ti. (163926)
114 111 not 113 (7525)
115 limit 114 to yr="2010 -Current" (4659)
116 remove duplicates from 115 (4578)
117 114 not 116 (2947)
118 remove duplicates from 117 (2887)
119 116 or 118 (7465)

CONTRIBUTIONS OF AUTHORS

KJ drafted the protocol.

JB, GG, FH, DGJ, JM, JN, GR, and DMT contributed to the development of the protocol and agreed on the final text.

DECLARATIONS OF INTEREST

KJ: none.

FH: none.

JN: none.

JM: none.

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GG: none.

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GR: none.