

Evidence Portfolio – Chronic Conditions Subcommittee, Question 7

In individuals with intellectual disabilities, what is the relationship between physical activity and (1) risk of co-morbid conditions, (2) physical function, and (3) health-related quality of life?

Sources of Evidence: Systematic Reviews and Meta-Analysis

Conclusion Statements and Grades

RISK OF CO-MORBID CONDITIONS

Insufficient evidence is available to determine the relationship of physical activity with risk of comorbid conditions in individuals with intellectual disabilities. **PAGAC Grade: Not assignable.**

PHYSICAL FUNCTION

Limited evidence suggests that physical activity improves physical function in children and adults with intellectual disabilities. **PAGAC Grade: Limited.**

HEALTH-RELATED QUALITY OF LIFE

Insufficient evidence is available to determine the relationship of physical activity with health-related quality of life in individuals with intellectual disabilities. **PAGAC Grade: Not assignable.**

Description of the Evidence

The Chronic Conditions Subcommittee chose to rely exclusively on existing reviews including systematic reviews, meta-analyses, pooled analyses, and reports for this question. As determined by the Subcommittee, the search for existing reviews identified sufficient literature to answer the research question. Additional searches for original research were not conducted based on the a-priori decision to focus on existing reviews.

RISK OF CO-MORBID CONDITIONS

Existing Systematic Review

Overview

One systematic review examining co-morbid conditions among individuals with intellectual disabilities was included.¹ The systematic review included 20 studies and covered a timeframe from 1980 to May 2013.

Exposures

The included systematic review¹ examined exercise programs that included aerobic exercise and strength training. Some of the specific types of aerobic activities assessed included running, jogging, soccer, basketball, and dancing.

Outcomes

Studies in the included systematic review assessed a variety of co-morbid conditions including different types of challenging behaviors and hyperactivity.

PHYSICAL FUNCTION

Existing Systematic Reviews and Meta-Analysis

Overview

One meta-analysis² and two systematic reviews^{3,4} examining physical function among individuals with intellectual disabilities were included. One systematic review was published in 2011, while two existing reviews were published in 2017.

The meta-analysis² included 7 studies that assessed individuals with delayed ambulation (developmental delay, cerebral palsy, and Down syndrome) published between March 2011 and May 2017.

One systematic review³ included 11 studies and covered a timeframe from 1990 to January 2010. The other systematic review⁴ included 19 studies that assessed individuals with Down syndrome published between Inception and March 2016.

Exposures

The meta-analysis² examined aerobic exercise (e.g., treadmill use).

Studies in [Bartlo and Klein](#)³ assessed physical activity programs using different modalities including walking, bicycle ergometer, resistance training, stepping activities, elliptical training, rowing, balance activities, dancing, and plyometric activities. The systematic review⁴ examined traditional exercise programs (e.g., aerobic and/or strength training) and non-traditional exercise programs (e.g., bike riding, dancing, swimming, and judo).

Outcomes

All existing reviews examined domains of physical function. [Valentín-Gudiol et al](#)² assessed step frequency and quality, independent walking, and gross motor function. [Bartlo and Klein](#)³ assessed balance and strength. [Hardee and Fetters](#)⁴ examined a function domain (e.g., strength and endurance) and an activity domain (e.g., gross motor activity tests) using appropriate tests by age group (<18 years and ≥18 years).

HEALTH-RELATED QUALITY OF LIFE

Existing Systematic Review

Overview

One systematic review examining health-related quality of life among individuals with intellectual disabilities was included.³ The systematic review included 11 studies and covered a timeframe from 1990 to January 2010.

Exposures

Studies in the included review³ assessed physical activity programs using different modalities including walking, bicycle ergometer, resistance training, stepping activities, elliptical training, rowing, balance activities, dancing, and plyometric activities.

Outcomes

Studies in the included systematic review³ assessed health-related quality of life. Other outcomes examined included balance, strength, and cardiovascular fitness.

Populations Analyzed

The table below lists the populations analyzed in each article.

Table 1. Populations Analyzed by All Sources of Evidence

	Age	Chronic Conditions
Bartlo, 2011	Age ≥ 18	Intellectual disability
Hardee, 2017	Age ≤ 18 , >18	Down syndrome
Ogg-Groenendaal, 2014	Age 5–53	Intellectual disabilities
Valentín-Gudiol, 2017	Age <6	Delayed ambulation (subgroups: developmental delay, cerebral palsy, and Down syndrome)

Supporting Evidence

Existing Systematic Reviews and Meta-Analysis

Table 2. Existing Systematic Reviews and Meta-Analysis Individual Evidence Summary Tables

Health-Related Quality of Life, Physical Function	
<p>Systematic Review Citation: Bartlo P, Klein PJ. Physical activity benefits and needs in adults with intellectual disabilities: systematic review of the literature. <i>Am J Intellect Dev Disabil.</i> 2011;116(3):220–232. doi:10.1352/1944-7558-116.3.220.</p>	
<p>Purpose: To systematically search and critically examine the strength of research evidence on the effectiveness and feasibility of PA programs for adults with intellectual disability.</p>	<p>Abstract: Regular physical activity is vital for adult individuals with intellectual disabilities. The purpose of this review was to assess critically the evidence on effectiveness of physical activity interventions for adults with intellectual disability. An electronic database search was conducted. Research was then assessed for methodological rigor, and strength of the evidence was determined. Eleven clinical studies met inclusion criteria. Interventions studied included a variety of physical activity modes. Critical review revealed moderate to strong evidence that physical activity positively affected balance, muscle strength, and quality of life in individuals with intellectual disability. The authors also found that the research in this area needs to be translated into practice, specifically the development of physical activity programs that are adaptable to the needs of individuals with intellectual disability.</p>
<p>Timeframe: 1990–January 2010</p>	
<p>Total # of Studies: 11</p>	
<p>Exposure Definition: PA programs using different modalities including walking, bicycle ergometry, resistance training of upper body and/or lower body, stepping activities, elliptical training, rowing, balance activities, dancing, and plyometric activities. Length of programs ranged from 6 to 12 weeks.</p> <p>Measures Steps: No Measures Bouts: No Examines HIIT: No</p>	
<p>Outcomes Addressed: Quality of Life: short form-36. Balance: timed up and go test, functional reach test. Muscle Strength. Cardiovascular Fitness.</p> <p>Examine Cardiorespiratory Fitness as Outcome: Yes</p>	
<p>Populations Analyzed: Age ≥18, Intellectual disability</p>	<p>Author-Stated Funding Source: Not reported.</p>

Physical Function

Systematic Review	
Citation: Hardee JP, Fetters L. The effect of exercise intervention on daily life activities and social participation in individuals with Down syndrome: a systematic review. <i>Res Dev Disabil.</i> 2017;62:81–103. doi:10.1016/j.ridd.2017.01.011.	
Purpose: To evaluate the research on the effectiveness of exercise intervention on daily life activities and participation in individuals with Down Syndrome (DS).	Abstract: BACKGROUND: Few systematic reviews have looked at the effect of exercise intervention on activities of daily living and social participation in individuals with Down syndrome (DS) across the lifespan. AIMS: To evaluate the research on the effectiveness of exercise intervention on daily life activities and participation in individuals with DS. METHODS AND PROCEDURES: Studies are from six electronic databases (CINHAL, Cochrane, ERIC, PEDro, PubMed, and PsycINFO) from 1987 to 2016. Nineteen studies met inclusion criteria. American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) levels of evidence and an Intervention Clinical Appraisal Form were used to independently assess study quality and outcome measures coded using the International Classification of Functioning, Disability, and Health (ICF). OUTCOMES AND RESULTS: There were 525 participants, age range, 3-65.5 years. The quality of the studies ranges from AACPDM Level I-IV and Intervention Clinical Appraisal Form scores of 4 to 10. A meta analysis was not conducted due to heterogeneity of studies. CONCLUSIONS AND IMPLICATIONS: Exercise intervention was supported for both daily life activities and participation. Rigorous research studies are needed across the lifespan using objective outcome measures for ICF levels.
Timeframe: Inception–March 2016	
Total # of Studies: 19	
Exposure Definition: Exercise interventions in the ≤18 age group included primarily individualized ‘traditional exercise programs’ that utilized progressive resistance training with weight machines or a combination of aerobic and strength training. Non-traditional exercise programs using bike riding, dance, etc., were also utilized. Duration of the intervention ranged from 2–48 sessions completed as 60 minutes sessions 2–3 times/week. The >18 age group utilized progressive resistance training, treadmill walking, a combination of the two, and non-traditional interventions including swim and judo. Duration of the intervention ranges from 1–75 sessions completed as 10–120 min sessions 1–3 times/week.	
Measures Steps: No Measures Bouts: No Examines HIIT: No	
Outcomes Addressed: Age ≤18: Body, Structure, Function domain: Balance subset of the Bruininks-Oseretsky Test of Motor Proficiency (BOTMP), cardiovascular fitness, leg strength, muscle strength and endurance, balance. Activity domain: physical activity, jump testing, work task performance, timed up and down stairs test, independent riding of two-wheeled bicycle. Participation domain: pediatric quality of life inventory. Age >18: Body, Structure, Function domain: grip strength, knee extension/flexion strength and torque, upper extremity muscle endurance, peak aerobic activity. Activity domain: gross motor function measure 88, timed up and go test, time to ascend/descend 10 steps, 25 foot walk test. Participation domain: life satisfaction scale. Examine Cardiorespiratory Fitness as Outcome: No	
Populations Analyzed: Age ≤18, >18; Down Syndrome	Author-Statement Funding Source: Not reported.

Risk of Co-Morbid Conditions

Systematic Review

Citation: Ogg-Groenendaal M, Hermans H, Claessens B. A systematic review on the effect of exercise interventions on challenging behavior for people with intellectual disabilities. *Res Dev Disabil.* 2014;35(7):1507-1517. doi:10.1016/j.ridd.2014.04.003.

Purpose: To determine if exercise interventions can lead to an observable and measurable reduction in challenging behavior in people with intellectual disabilities, and to get insight into the state of affairs concerning the optimal intensity, duration, type, and frequency of effective exercise interventions.

Timeframe: 1980–May 2013

Total # of Studies: 20

Exposure Definition: Exercise programs included aerobic exercise and strength training. Exercise modalities included running, jogging, soccer, basketball, and dancing. Programs varied in duration, length, and frequency.

Measures Steps: No

Measures Bouts: No

Examines HIIT: No

Outcomes Addressed: Risk of co-morbid conditions (challenging behavior (1), stereotypical behavior (2), aggressive/destructive behavior (3), self-injurious behavior (4), hyperactivity, and other challenging behaviors like inappropriate vocalizations): measured by standardized questionnaires or observational ratings.

Examine Cardiorespiratory Fitness as Outcome: No

Populations Analyzed: Age 5–53, Intellectual disabilities

Abstract: BACKGROUND: Challenging behavior, such as aggressive or self-injurious behavior, is a major concern for the health and well-being of people with intellectual disabilities (ID) and for their relatives, friends, and caregivers. The most common contemporary treatments have drawbacks, such as the adverse side effects of antipsychotics. Exercise interventions could be a good alternative, but little is known about its beneficial effects on challenging behavior in people with ID yet. METHOD: A systematic review of the literature was done and methodological quality of the selected studies has been judged on four points. With one-way Analysis of Variance (ANOVA), the effect of exercise interventions on challenging behavior was studied. The effect of low versus high intensity exercise interventions was studied with independent samples T-test using mean improvement scores. RESULTS: Twenty studies studying the effects of exercise interventions on challenging behavior in people with ID have been found. A quantitative evaluation of the results showed a significant decrease in challenging behavior after participating in an exercise intervention (M=30.9%, 95% CI: 25.0, 36.8). Furthermore, no significant difference was found between high (M=32.2%) and low (M=22.9%) intensity exercise interventions. CONCLUSIONS: The found decrease in challenging behavior shows that exercise seems to be recommendable as an effective treatment for people with challenging behavior and ID. However, most studies were of low methodological quality and more research is needed to optimize recommendations about the exact intensity, duration, frequency, and mode (group or individual) of exercise interventions for this group of people.

Author-Stated Funding Source: Not reported.

Physical Function

Meta-Analysis	
Citation: Valentín-Gudiol M, Mattern-Baxter K, Girabent-Farrés M, Bagur-Calafat C, Hadders-Algra M, Angulo-Barroso RM. Treadmill interventions in children under six years of age at risk of neuromotor delay. <i>Cochrane Database Syst Rev.</i> 2017(7):CD009242. doi:10.1002/14651858.CD009242.pub3.	
Purpose: To assess the effectiveness of treadmill interventions on locomotor development in children with delayed ambulation or in pre-ambulatory children (or both) who are under six years of age and who are at risk for neuromotor delay.	Abstract: Background: Delayed motor development may occur in children with Down syndrome, cerebral palsy, general developmental delay or children born preterm. It limits the child's exploration of the environment and can hinder cognitive and social-emotional development. Literature suggests that task-specific training, such as locomotor treadmill training, facilitates motor development. Objectives: To assess the effectiveness of treadmill interventions on locomotor development in children with delayed ambulation or in pre-ambulatory children (or both), who are under six years of age and who are at risk for neuromotor delay. Search methods: In May 2017, we searched CENTRAL, MEDLINE, Embase, six other databases and a number of trials registers. We also searched the reference lists of relevant studies and systematic reviews. Selection criteria: We included randomised controlled trials (RCTs) and quasi-RCTs that evaluated the effect of treadmill intervention in the target population. Data collection and analysis: Four authors independently extracted the data. Outcome parameters were structured according to the International Classification of Functioning, Disability and Health model. Main results: This is an update of a Cochrane review from 2011, which included five trials. This update includes seven studies on treadmill intervention in 175 children: 104 were allocated to treadmill groups, and 71 were controls. The studies varied in population (children with Down syndrome, cerebral palsy, developmental delay or at moderate risk for neuromotor delay); comparison type (treadmill versus no treadmill; treadmill with versus without orthoses; high- versus low-intensity training); study duration, and assessed outcomes. Due to the diversity of the studies, only data from five studies were used in meta-analyses for five outcomes: age of independent walking onset, overall gross motor function, gross motor function related to standing and walking, and gait velocity. GRADE assessments of quality of the evidence ranged from high to very low. The effects of treadmill intervention on independent walking onset compared to no treadmill intervention was population dependent, but showed no overall effect (mean difference (MD) -2.08, 95% confidence intervals (CI) -5.38 to 1.22, 2 studies, 58 children; moderate-quality evidence): 30 children with Down syndrome benefited from treadmill training (MD -4.00, 95% CI -6.96 to -1.04), but 28 children at moderate risk of developmental delay did not (MD -0.60, 95% CI -2.34 to 1.14). We found no evidence regarding walking onset in two studies that compared treadmill intervention with and without orthotics in 17 children (MD 0.10, 95% CI -5.96 to 6.16), and high- versus low-intensity treadmill interventions in 30 children with Down syndrome (MD -2.13, 95% -4.96 to 0.70). Treadmill intervention did not improve overall gross motor function (MD 0.88, 95% CI -4.54 to 6.30, 2 studies, 36 children; moderate-quality evidence) or gross motor skills related to standing (MD 5.41, 95% CI -1.64 to 12.43, 2 studies, 32 children; low-quality evidence), and had a negligible improvement in gross motor skills related to walking (MD 4.51, 95% CI 0.29 to 8.73, 2 studies, 32 children; low-quality evidence). It led to improved walking skills in 20 ambulatory children with developmental delay (MD
Timeframe: March 2011–May 2017	
Total # of Studies: 7	
Exposure Definition: Programs included aerobic exercise such as treadmill use. Programs varied in duration, length, and frequency of sessions.	
Measures Steps: No	
Measures Bouts: No	
Examines HIIT: No	
Outcomes Addressed: Physical Function:	

<p>step frequency, step quality, independent walking, and gross motor function assessed using various measures. Quality of life.</p> <p>Examine Cardiorespiratory Fitness as Outcome: No</p>	<p>7.60, 95% CI 0.88 to 14.32, 1 study) and favourable gross motor skills in 12 children with cerebral palsy (MD 8.00, 95% CI 3.18 to 12.82). A study which compared treadmill intervention with and without orthotics in 17 children with Down syndrome suggested that adding orthotics might hinder overall gross motor progress (MD -8.40, 95% CI -14.55 to -2.25). Overall, treadmill intervention showed a very small increase in walking speed compared to no treadmill intervention (MD 0.23, 95% CI 0.08 to 0.37, 2 studies, 32 children; high-quality evidence). Treadmill intervention increased walking speed in 20 ambulatory children with developmental delay (MD 0.25, 95% CI 0.08 to 0.42), but not in 12 children with cerebral palsy (MD 0.18, 95% CI -0.09 to 0.45). Authors' conclusions: This update of the review from 2011 provides additional evidence of the efficacy of treadmill intervention for certain groups of children up to six years of age, but power to find significant results still remains limited. The current findings indicate that treadmill intervention may accelerate the development of independent walking in children with Down syndrome and may accelerate motor skill attainment in children with cerebral palsy and general developmental delay. Future research should first confirm these findings with larger and better designed studies, especially for infants with cerebral palsy and developmental delay. Once efficacy is established, research should examine the optimal dosage of treadmill intervention in these populations.</p>
<p>Populations Analyzed: Age <6 years, Delayed ambulation (subgroups: developmental delay, cerebral palsy, and Down syndrome)</p>	<p>Author-Stated Funding Source: National Institute for Health Research.</p>

Table 3. Existing Systematic Reviews and Meta-Analysis Quality Assessment Chart

AMSTARExBP: SR/MA	Bartlo, 2011	Hardee, 2017	Ogg-Groenendaal, 2014	Valentín-Gudiol, 2017
Review questions and inclusion/exclusion criteria delineated prior to executing search strategy.	Yes	Yes	Yes	Yes
Population variables defined and considered in methods.	No	Yes	No	No
Comprehensive literature search performed.	Yes	Yes	Yes	Yes
Duplicate study selection and data extraction performed.	No	No	Yes	Yes
Search strategy clearly described.	Yes	Yes	Yes	Yes
Relevant grey literature included in review.	Yes	Yes	No	Yes
List of studies (included and excluded) provided.	No	No	No	Yes
Characteristics of included studies provided.	Yes	Yes	Yes	Yes
FITT defined and examined in relation to outcome effect sizes.	N/A	N/A	N/A	No
Scientific quality (risk of bias) of included studies assessed and documented.	Yes	Yes	Yes	Yes
Results depended on study quality, either overall, or in interaction with moderators.	No	No	No	No
Scientific quality used appropriately in formulating conclusions.	Yes	No	Yes	Yes
Data appropriately synthesized and if applicable, heterogeneity assessed.	N/A	N/A	N/A	Yes
Effect size index chosen justified, statistically.	N/A	N/A	N/A	Yes
Individual-level meta-analysis used.	N/A	N/A	N/A	No
Practical recommendations clearly addressed.	Yes	Yes	Yes	Yes
Likelihood of publication bias assessed.	No	No	No	Yes
Conflict of interest disclosed.	No	No	Yes	Yes

Appendices

Appendix A: Analytical Framework

Topic Area
Chronic Conditions

Systematic Review Questions

In individuals with intellectual disabilities, what is the relationship between physical activity and (1) risk of co-morbid conditions, (2) physical function, and (3) health-related quality of life?

Population

Individuals of all ages with intellectual disabilities

Comparison

Individuals with intellectual disabilities who participate in varying levels of physical activity

Exposure

All types and intensities of physical activity, including sedentary behavior

Endpoint Health Outcomes

- Risk of co-morbid conditions
- Physical function
- Health-related quality of life

Key Definitions

- Intellectual disability is characterized by significant limitation in both intellectual function and adaptive behavior, defined as the collection of conceptual, social, and practical skills that are learned and performed within everyday life, that manifests before the age of 18. Source: American Association on Intellectual and Developmental Disabilities. Definition of intellectual disability. American Association on Intellectual and Developmental Disabilities website. <http://aaid.org/intellectual-disability/definition#.Wjvo81WnFO9>. Accessed December 21, 2017.
- Risk of co-morbid conditions: The chance of having one or more additional conditions.
- Physical function: “Physical function” and “physical functioning” are regarded as synonyms that refer to: “the ability of a person to move around and to perform types of physical activity.”
 - For example, measures of physical function include measures of ability to walk (e.g., usually gait speed), run, climb stairs, carry groceries, sweep the floor, stand up, and bathe oneself.
 - As measures of behavioral abilities, physical function measures do not include:
 - Physiologic measures, including measures of physiologic capacity (e.g., maximal lung capacities, maximal aerobic capacity, maximal muscle strength, bone density).
 - Measures of the environment or of the host-environmental interaction (e.g., disability accommodation).
 - Measures of what a person usually does (e.g., physical activity level) (as opposed to what a person is capable of doing).
- Health-related quality of life: “Health-related quality of life (HRQOL) is a multi-dimensional concept that includes domains related to physical, mental, emotional, and social functioning.” Source: Healthy People 2020. Health-related quality of life & well-being. HealthyPeople.gov website. <https://www.healthypeople.gov/2020/topics-objectives/topic/health-related-quality-of-life-well-being>. Accessed December 21, 2017.

Appendix B: Final Search Strategy

Search Strategy: PubMed (Systematic Reviews, Meta-Analyses, Pooled Analyses, and High-Quality Reports)

Database: PubMed; Date of Search: 8/30/17; 47 results

Set	Search Strategy
Limit: Language	(English[lang])
Limit: Exclude animal only	NOT ("Animals"[mh] NOT ("Animals"[mh] AND "Humans"[mh]))
Limit: Publication Date (Systematic Reviews/Meta-Analyses)	AND ("2011/01/01"[PDAT] : "3000/12/31"[PDAT])
Limit: Publication Type Include (Systematic Reviews/Meta-Analyses)	AND (systematic[sb] OR meta-analysis[pt] OR "systematic review"[tiab] OR "systematic literature review"[tiab] OR metaanalysis[tiab] OR "meta analysis"[tiab] OR metanalyses[tiab] OR "meta analyses"[tiab] OR "pooled analysis"[tiab] OR "pooled analyses"[tiab] OR "pooled data"[tiab])
Limit: Publication Type Exclude (Systematic Reviews/Meta-Analyses)	NOT ("comment"[Publication Type] OR "editorial"[Publication Type])
Physical Activity	AND (("Aerobic endurance"[tiab] OR "Bicycl*" [tiab] OR "Endurance training"[tiab] OR "Exercise"[mh] OR "Exercise"[tiab] OR "Exercises"[tiab] OR "Free living activities"[tiab] OR "Free living activity"[tiab] OR "Functional training"[tiab] OR "Leisure-time physical activity"[tiab] OR "Lifestyle activities"[tiab] OR "Lifestyle activity"[tiab] OR "Muscle stretching exercises"[mh] OR "Physical activity"[tiab] OR "Qi gong"[tiab] OR "Recreational activities"[tiab] OR "Recreational activity"[tiab] OR "Resistance training"[tiab] OR "Running"[tiab] OR "Sedentary lifestyle"[mh] OR "Speed training"[tiab] OR "Strength training"[tiab] OR "Tai chi"[tiab] OR "Tai ji"[mh] OR "Tai ji"[tiab] OR "Training duration"[tiab] OR "Training frequency"[tiab] OR "Training intensity"[tiab] OR "Treadmill"[tiab] OR "Walking"[tiab] OR "Weight lifting"[tiab] OR "Weight training"[tiab] OR "Yoga"[mh] OR "Yoga"[tiab]) OR ("Aerobic activities"[tiab] OR "Aerobic activity"[tiab] OR "Cardiovascular activities"[tiab] OR "Cardiovascular activity"[tiab] OR "Endurance activities"[tiab] OR "Endurance activity"[tiab] OR "Physical activities"[tiab] OR "Physical conditioning"[tiab] OR "Sedentary"[tiab]) NOT medline[sb]))
Population	AND ("Down syndrome"[mh] OR "Down syndrome"[tiab] OR "Downs syndrome"[tiab] OR "Down's syndrome"[tiab] OR "Mongolism"[tiab] OR "Trisomy 21"[tiab] OR "Trisomy G"[tiab] OR "Partial Trisomy 21"[tiab] OR "47,XX,+21"[tiab] OR "47,XY,+21"[tiab] OR "Intellectual disability"[mh] OR "Intellectual disability"[tiab] OR "Intellectual disabilities"[tiab] OR "Mental deficiency"[tiab] OR "Mental deficiencies"[tiab] OR "Intellectual development disorder"[tiab] OR

	"Intellectual development disorders"[tiab] OR "Mongoloidism"[tiab] OR "Translocation 15 21 22"[tiab] OR "Langdon Down Disease"[tiab])
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Search Strategy: CINAHL (Systematic Reviews, Meta Analyses, Pooled Analyses, and High-Quality Reports)

Database: CINAHL; Date of Search: 8/30/17; 3 results

Terms searched in title or abstract

Set	Search Terms
Physical Activity	("Aerobic endurance" OR "Bicycl*" OR "Endurance training" OR "Exercise" OR "Exercises" OR "Free living activities" OR "Free living activity" OR "Functional training" OR "Leisure-time physical activity" OR "Lifestyle activities" OR "Lifestyle activity" OR "Muscle stretching exercises" OR "Physical activity" OR "Qi gong" OR "Recreational activities" OR "Recreational activity" OR "Resistance training" OR "Running" OR "Sedentary lifestyle" OR "Speed training" OR "Strength training" OR "Tai chi" OR "Tai ji" OR "Tai ji" OR "Training duration" OR "Training frequency" OR "Training intensity" OR "Treadmill" OR "Walking" OR "Weight lifting" OR "Weight training" OR "Yoga" OR "Aerobic activities" OR "Aerobic activity" OR "Cardiovascular activities" OR "Cardiovascular activity" OR "Endurance activities" OR "Endurance activity" OR "Physical activities" OR "Physical conditioning" OR "Sedentary")
Population	AND ("Down syndrome" OR "Downs syndrome" OR "Down's syndrome" OR "Mongolism" OR "Trisomy 21" OR "Trisomy G" OR "Partial Trisomy 21" OR "47,XX,+21" OR "47,XY,+21" OR "Intellectual disability" OR "Intellectual disabilities" OR "Mental deficiency" OR "Mental deficiencies" OR "Intellectual development disorder" OR "Intellectual development disorders" OR "Mongoloidism" OR "Translocation 15 21 22" OR "Langdon Down Disease")
Systematic Reviews and Meta-Analyses	("systematic review" OR "systematic literature review" OR metaanalysis OR "meta analysis" OR metanalyses OR "meta analyses" OR "pooled analysis" OR "pooled analyses" OR "pooled data")
Limits	2011–present English language Peer reviewed Exclude Medline records Human

Search Strategy: Cochrane (Systematic Reviews, Meta-Analyses, Pooled Analyses, and High-Quality Reports)

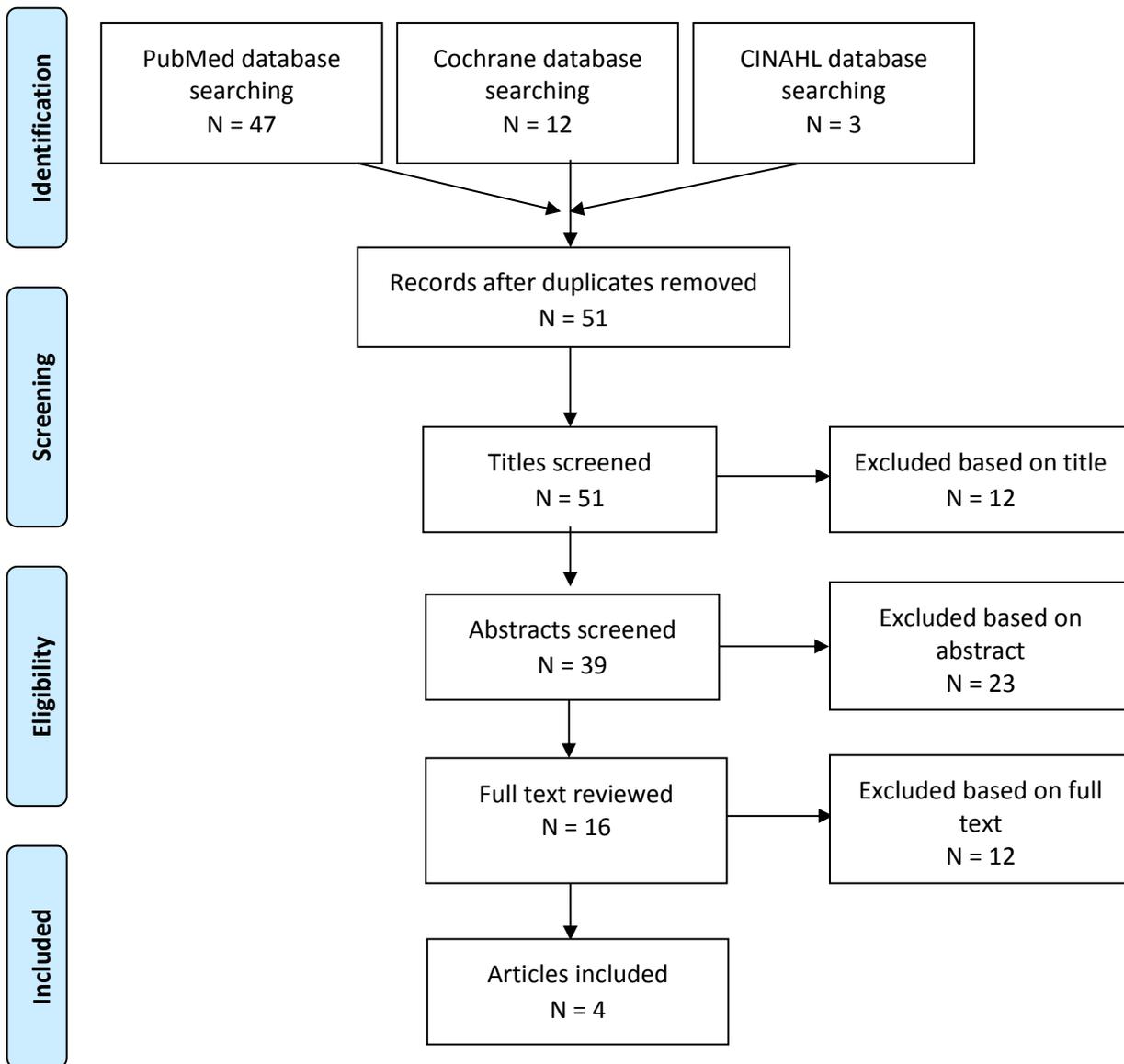
Database: Cochrane; Date of Search: 8/30/17; 12 results

Terms searched in title, abstract, or keywords

Set	Search Terms
Physical Activity	("Aerobic endurance" OR "Bicycl*" OR "Endurance training" OR "Exercise" OR "Exercises" OR "Free living activities" OR "Free living activity" OR "Functional training" OR "Leisure-time physical activity" OR "Lifestyle activities" OR "Lifestyle activity" OR "Muscle stretching exercises" OR "Physical activity" OR "Qi gong" OR "Recreational activities" OR "Recreational activity" OR "Resistance training" OR "Running" OR "Sedentary lifestyle" OR "Speed training" OR "Strength training" OR "Tai chi" OR "Tai ji" OR "Tai ji" OR "Training duration" OR "Training frequency" OR "Training intensity" OR "Treadmill" OR "Walking" OR "Weight lifting" OR "Weight training" OR "Yoga" OR "Aerobic activities" OR "Aerobic activity" OR "Cardiovascular activities" OR "Cardiovascular activity" OR "Endurance activities" OR "Endurance activity" OR "Physical activities" OR "Physical conditioning" OR "Sedentary")
Population	("Down syndrome" OR "Downs syndrome" OR "Down's syndrome" OR "Mongolism" OR "Trisomy 21" OR "Trisomy G" OR "Partial Trisomy 21" OR "47,XX,+21" OR "47,XY,+21" OR "Intellectual disability" OR "Intellectual disabilities" OR "Mental deficiency" OR "Mental deficiencies" OR "Intellectual development disorder" OR "Intellectual development disorders" OR "Mongoloidism" OR "Translocation 15 21 22" OR "Langdon Down Disease")
Limits	2011–present Word variations not searched Cochrane Reviews and Other Reviews

Appendix C: Literature Tree

Existing Systematic Reviews, Meta-Analyses, Pooled Analyses, and Reports Literature Tree



Appendix D: Inclusion/Exclusion Criteria

Chronic Conditions Subcommittee

In individuals with intellectual disabilities, what is the relationship between physical activity and (1) risk of co-morbid conditions, (2) physical function, and (3) health-related quality of life?

Category	Inclusion/Exclusion Criteria	Notes/Rationale
Publication Language	Include: <ul style="list-style-type: none"> • Studies published with full text in English 	
Publication Status	Include: <ul style="list-style-type: none"> • Studies published in peer-reviewed journals • Reports determined to have appropriate suitability and quality by PAGAC Exclude: <ul style="list-style-type: none"> • Grey literature, including unpublished data, manuscripts, abstracts, conference proceedings 	
Research Type	Include: <ul style="list-style-type: none"> • Original research • Meta-analyses • Systematic reviews • Reports determined to have appropriate suitability and quality by PAGAC 	
Study Subjects	Include: <ul style="list-style-type: none"> • Human subjects 	
Age of Study Subjects	Include: <ul style="list-style-type: none"> • People of all ages 	
Health Status of Study Subjects	Include: <ul style="list-style-type: none"> • Studies of people with intellectual disabilities • Studies of people with intellectual disabilities in combination with other chronic conditions reviewed on a case-by-case basis Exclude: <ul style="list-style-type: none"> • Studies that include people with intellectual disabilities as part of the study sample, but do not analyze results separately for people with intellectual disabilities 	Sample intellectual disabilities: Down syndrome, mental retardation, fragile X syndrome, autism spectrum disorders
Comparison	Include: <ul style="list-style-type: none"> • Adults who participate in varying levels of physical activity, including acute or chronic exercise or no reported physical activity • Recreational athletes (marathons ok as long as the study looks at a diverse group of runners—not just the elites) Exclude:	

	<ul style="list-style-type: none"> • High-performance athletes • Studies comparing athletes to non-athletes • Studies comparing athlete types (e.g., comparing runners to soccer players) 	
Date of Publication	<p>Include:</p> <ul style="list-style-type: none"> • Systematic reviews, meta-analyses, pooled analyses, and reports published from 2011 to 2016 	
Study Design	<p>Include:</p> <ul style="list-style-type: none"> • Systematic reviews • Meta-analyses • Pooled analyses • PAGAC-approved reports <p>Exclude:</p> <ul style="list-style-type: none"> • Randomized controlled trials • Prospective cohort studies • Narrative reviews • Commentaries • Editorials • Non-randomized controlled trials • Retrospective cohort studies • Case-control studies • Cross-sectional studies • Before-and-after studies 	
Intervention/ Exposure	<p>Include studies in which the exposure or intervention is:</p> <ul style="list-style-type: none"> • All types and intensities of physical activity, including sedentary behavior • Studies with single, acute bouts of exercise as the exposure <p>Exclude:</p> <ul style="list-style-type: none"> • Studies that do not include physical activity • Studies where physical activity is used solely as a confounding variable • Studies of a single, acute session of exercise • Studies of multimodal interventions that do not present data on physical activity alone • Studies of a disease-specific therapeutic exercise (e.g., rehabilitation) delivered by a medical professional (e.g., physical therapist) • Studies with measures of physical fitness as the exposure 	
Outcome	<p>Include studies in which the outcome is:</p> <ul style="list-style-type: none"> • Risk of co-morbid conditions • Physical function • Health-related quality of life 	

Appendix E: Rationale for Exclusion at Abstract or Full-Text Triage for Existing Systematic Reviews, Meta-Analyses, Pooled Analyses, and Reports

The table below lists the excluded articles with at least one reason for exclusion, but may not reflect all possible reasons.

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Adair B, Ullenhag A, Keen D, Granlund M, Imms C. The effect of interventions aimed at improving participation outcomes for children with disabilities: a systematic review. <i>Dev Med Child Neurol.</i> 2015;57(12):1093-1104. doi:10.1111/dmcn.12809.	X					
Ayán Pérez C, Martínez-Lemos I, Lago-Ballesteros J, Cancela Carral JM, Loira-Camiña N. Reliability and validity of physical fitness field-based tests in Down syndrome: a systematic review. <i>J Policy Pract Intellect Disabil.</i> 2016;13(2):142-156. doi:10.1111/jppi.12155.	X			X		
Baggot PJ, Baggot RM. Doubling the rate of neurologic development in Down syndrome: a pilot study. <i>Issues Law Med.</i> 2016;31(2):125-137.				X		
Bossink LWM, van der Putten AA, Vlaskamp C. Understanding low levels of physical activity in people with intellectual disabilities: a systematic review to identify barriers and facilitators. <i>Res Dev Disabil.</i> 2017;68:95-110. doi:10.1016/j.ridd.2017.06.008.	X					
Brooker K, van Dooren K, McPherson L, Lennox N, Ware R. A systematic review of interventions aiming to improve involvement in physical activity among adults with intellectual disability. <i>J Phys Act Health.</i> 2015;12(3):434-444. doi:10.1123/jpah.2013-0014.	X					
Dairo YM, Collett J, Dawes H, Oskrochi GR. Physical activity levels in adults with intellectual disabilities: a systematic review. <i>Prev Med Rep.</i> 2016;4:209-219. doi:10.1016/j.pmedr.2016.06.008.	X			X		
Enkelaar L, Smulders E, van Schrojenstein Lantman-de Valk H, Geurts AC, Weerdesteyn V. A review of balance and gait capacities in relation to falls in persons with intellectual disability. <i>Res Dev Disabil.</i> 2012;33(1):291-306. doi:10.1016/j.ridd.2011.08.028.						X
Harris L, Hankey C, Murray H, Melville C. The effects of physical activity interventions on preventing weight gain and the effects on body composition in young adults with intellectual disabilities: systematic review and meta-analysis of randomized controlled trials. <i>Clin Obes.</i> 2015;5(4):198-210. doi:10.1111/cob.12103.	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Hinckson EA, Curtis A. Measuring physical activity in children and youth living with intellectual disabilities: a systematic review. <i>Res Dev Disabil.</i> 2013;34(1):72-86. doi:10.1016/j.ridd.2012.07.022.	X					
Hocking J, McNeil J, Campbell J. Physical therapy interventions for gross motor skills in people with an intellectual disability aged 6 years and over: a systematic review. <i>Int J Evid Based Healthc.</i> 2016;14(4):166-174. doi:10.1097/XEB.000000000000085.						X
Jackson CF, Makin SM, Marson AG, Kerr M. Non-pharmacological interventions for people with epilepsy and intellectual disabilities. <i>Cochrane Database Syst Rev.</i> 2015;(9):Cd005502. doi:10.1002/14651858.CD005502.pub3.					X	
Jefferson A, Leonard H, Siafarikas A, et al. Clinical guidelines for management of bone health in Rett syndrome based on expert consensus and available evidence. <i>PLoS One.</i> 2016;11(2):e0146824. doi:10.1371/journal.pone.0146824.	X					
Jeng SC, Chang CW, Liu WY, Hou YJ, Lin YH. Exercise training on skill-related physical fitness in adolescents with intellectual disability: a systematic review and meta-analysis. <i>Disabil Health J.</i> 2017;10(2):198-206. doi:10.1016/j.dhjo.2016.12.003.	X					
Keeratisiroj O, Thawinchai N, Siritaratiwat W, Buntragulpoontawee M, Pratoomsoot C. Prognostic predictors for ambulation in children with cerebral palsy: a systematic review and meta-analysis of observational studies. <i>Disabil Rehabil.</i> 2016:1-9. doi:10.1080/09638288.2016.1250119.				X		
Lee AS-Y, Gibbon FE. Non-speech oral motor treatment for children with developmental speech sound disorders. <i>Cochrane Database Syst Rev.</i> 2015;(3):Cd009383. doi:10.1002/14651858.CD009383.pub2.	X			X		
Leung W, Siebert EA, Yun J. Measuring physical activity with accelerometers for individuals with intellectual disability: a systematic review. <i>Res Dev Disabil.</i> 2017;67:60-70. doi:10.1016/j.ridd.2017.06.001.	X					
Li C, Chen S, Meng How Y, Zhang AL. Benefits of physical exercise intervention on fitness of individuals with Down syndrome: a systematic review of randomized-controlled trials. <i>Int J Rehabil Res.</i> 2013;36(3):187-195. doi:10.1097/MRR.0b013e3283634e9c.						X
Maiano C, Normand CL, Aimé A, Bégarie J. Lifestyle interventions targeting changes in body weight and composition among youth	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
with an intellectual disability: a systematic review. <i>Res Dev Disabil.</i> 2014;35(8):1914-1926. doi:10.1016/j.ridd.2014.04.014.						
McGarty AM, Penpraze V, Melville CA. Accelerometer use during field-based physical activity research in children and adolescents with intellectual disabilities: a systematic review. <i>Res Dev Disabil.</i> 2014;35(5):973-981. doi:10.1016/j.ridd.2014.02.009.	X			X		
Melville CA, Oppewal A, Schäfer Elinder L. Definitions, measurement and prevalence of sedentary behaviour in adults with intellectual disabilities—a systematic review. <i>Prev Med.</i> 2017;97:62-71. doi:10.1016/j.ypmed.2016.12.052.	X					
Morgan AT, Dodrill P, Ward EC. Interventions for oropharyngeal dysphagia in children with neurological impairment. <i>Cochrane Database Syst Rev.</i> 2012;10:Cd009456. doi:10.1002/14651858.CD009456.pub2.	X			X		
Morrissey C, Langdon PE, Geach N, et al. A systematic review and synthesis of outcome domains for use within forensic services for people with intellectual disabilities. <i>BJPsych Open.</i> 2017;3(1):41-56. doi:10.1192/bjpo.bp.116.003616.	X			X		
Nardes F, Araujo AP, Ribeiro MG. Mental retardation in Duchenne muscular dystrophy. <i>J Pediatr (Rio J).</i> 2012;88(1):6-16. doi:10.2223/JPED.2148.				X		
Osugo M, Cooper SA. Interventions for adults with mild intellectual disabilities and mental ill-health: a systematic review. <i>J Intellect Disabil Res.</i> 2016;60(6):615-622. doi:10.1111/jir.12285.	X					
Rhodes RE, Temple VA, Tuokko HA. Evidence-based risk assessment and recommendations for physical activity clearance: cognitive and psychological conditions. <i>Appl Physiol Nutr Metab.</i> 2011;36(suppl 1):S113-S153. doi:10.1139/h11-041.	X					
Scott HM, Havercamp SM. Systematic review of health promotion programs focused on behavioral changes for people with intellectual disability. <i>Intellect Dev Disabil.</i> 2016;54(1):63-76. doi:10.1352/1934-9556-54.1.63.				X		
Serwacki ML, Cook-Cottone C. Yoga in the schools: a systematic review of the literature. <i>Int J Yoga Therap.</i> 2012;(22):101-109.						X
Shin IS, Park EY. Meta-analysis of the effect of exercise programs for individuals with intellectual disabilities. <i>Res Dev Disabil.</i> 2012;33(6):1937-1947. doi:10.1016/j.ridd.2012.05.019.						X

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Smith BA, Bompiani E. Using a treadmill intervention to promote the onset of independent walking in infants with or at risk for neuromotor delay. <i>Phys Ther.</i> 2013;93(11):1441-1446. doi:10.2522/ptj.20120476.			X			
Spanos D, Melville CA, Hankey CR. Weight management interventions in adults with intellectual disabilities and obesity: a systematic review of the evidence. <i>Nutr J.</i> 2013;12:132. doi:10.1186/1475-2891-12-132.	X					
Staiano AE, Flynn R. Therapeutic uses of active videogames: a systematic review. <i>Games Health J.</i> 2014;3(6):351-365. doi:10.1089/g4h.2013.0100.			X			
Sugimoto D, Bowen SL, Meehan WP 3rd, Stracciolini A. Effects of neuromuscular training on children and young adults with Down syndrome: systematic review and meta-analysis. <i>Res Dev Disabil.</i> 2016;55:197-206. doi:10.1016/j.ridd.2016.04.003.						X
Valentin-Gudiol M, Bagur-Calafat C, Girabent-Farrés M, Hadders-Algra M, Mattern-Baxter K, Angulo-Barroso R. Treadmill interventions with partial body weight support in children under six years of age at risk of neuromotor delay: a report of a Cochrane systematic review and meta-analysis. <i>Eur J Phys Rehabil Med.</i> 2013;49(1):67-91.		X				
Valentin-Gudiol M, Mattern-Baxter K, Girabent-Farrés M, Bagur-Calafat C, Hadders-Algra M, Angulo-Barroso RM. Treadmill interventions with partial body weight support in children under six years of age at risk of neuromotor delay. <i>Cochrane Database Syst Rev.</i> 2011;(12):Cd009242. doi:10.1002/14651858.CD009242.pub2.						X
Willems M, Hilgenkamp TI, Havik E, Waninge A, Melville CA. Use of behaviour change techniques in lifestyle change interventions for people with intellectual disabilities: a systematic review. <i>Res Dev Disabil.</i> 2017;60:256-268. doi:10.1016/j.ridd.2016.10.008.	X			X		

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2. Valentín-Gudiol M, Mattern-Baxter K, Girabent-Farrés M, Bagur-Calafat C, Hadders-Algra M, Angulo-Barroso RM. Treadmill interventions in children under six years of age at risk of neuromotor delay. *Cochrane Database Syst Rev.* 2017(7):CD009242. doi:10.1002/14651858.CD009242.pub3.
3. Bartlo P, Klein PJ. Physical activity benefits and needs in adults with intellectual disabilities: systematic review of the literature. *Am J Intellect Dev Disabil.* 2011;116(3):220–232. doi:10.1352/1944-7558-116.3.220.
4. Hardee JP, Fetters L. The effect of exercise intervention on daily life activities and social participation in individuals with Down syndrome: a systematic review. *Res Dev Disabil.* 2017;62:81–103. doi:10.1016/j.ridd.2017.01.011.