Standard

Review information

Authors

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Citation example: [Empty name]. Standard. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Abstract

Background

Objectives

Search methods

Selection criteria

Data collection and analysis

Main results

Authors' conclusions

Characteristics of studies

Characteristics of included studies

Bieler 2013

Methods	**Study design:** Randomized controlled trial **Study grouping:** Parallel group **Open Label:** **Cluster RCT:**
Participants	**Baseline Characteristics** Intervention Control **Included criteria:** Inclusion criteria were home-dwelling 60+ years old individuals with symptomatic HOA who met the clinical criteria of HOA according to American College of Rheumatology (24), and who were not on a waiting list for hip replacement. **Excluded criteria:** Exclusion criteria were: 1) symptomatic osteoarthritis of the knee or the big toe, 2) prior hip or knee replacement, 3) other types of arthritis, 4) previous hip fracture, 5) co-morbidity that prevented exercising, 6) inability to use public transportation, 7) treatment related to hip problems within the last 3 months, and 8) performing exercise/sports regularly twice or more weekly **Pretreatment:**
Interventions	**Intervention Characteristics** Intervention ● *Exercise description*: Unilateral: leg-press, seated knee extension, and hip extension in the standing position leaned forward 45 degrees with trunk and pelvis resting against an abdominal platform support. ● *Intensity + supervision*: Target load of 75% of 1RM. Load was increased from 20 RM to 10 RM during the first 4 weeks. Further, the intensity was increased from one bilateral set of 20 repetitions and two unilateral sets of 15 repetitions to one bilateral set of 10 repetitions to three unilateral sets of 10 repetitions. For the remaining three months, the training dose was maintained at the same relative level. The training load was adjusted every second

	week or when the participant could perform more than 10 repetitions. ● *Dose (no of sets and sessions, duration of intervention)*: 4 month training period, three times weekly. mean 44.6 ± 5.0 sessions. + 1 hour patient education session on the importance of exercise and physical activity Control ● *Exercise description*: Participants in the home based exercise group were instructed in exercises recommended by theDanish Arthritis Association by an experienced physical therapist. The home-based exercisesincluded hip range of motion, stretching and strengthening exercises e.g. a chair stand exercise, apelvic-lift, isometric hip flexion exercise in the standing position and gluteus medius exercise in theside lying position which was progressed with elastic bands as resistance. ● *Intensity + supervision*: homed-based and not supervised. Gluteus medius exercise in theside lying position which was progressed with elastic bands as resistance. ● *Dose (no of sets and sessions, duration of intervention)*: 4 months training periode. It does not say how often the patients should perform the exercises. mean 50.7 ± 11.9 sessions
Outcomes	*Patientrapporteret funktionsevne* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Fully reported ● **Scale**: HOOS ADL ● **Range**: 0-100 ● **Unit of measure**: Points ● **Direction**: Higher is better ● **Data value**: Endpoint ● **Notes**: Obs median (IQR) omregnet *Præstationsbaseret funktionsevne* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Fully reported ● **Scale**: 30 seconds chair stand test ● **Unit of measure**: number ● **Direction**: Higher is better ● **Data value**: Endpoint ● **Notes**: Slightly better performance in control group at baseline *Smerte (hofte)*

	● **Outcome type**: ContinuousOutcome *Helbredsrelateret livkvalitet* ● **Outcome type**: ContinuousOutcome *Træningsinducerede skader i bevægeapparatet* ● **Outcome type**: AdverseEvent ● **Reporting**: Not reported ● **Notes**: No numbers given. "Minor transient symptoms (pain, soreness and stiffness) in and around the joints were reported by some of the participant, especially in the beginning of the training period." *Smerte (ikke hofterelateret)* ● **Outcome type**: AdverseEvent ● **Reporting**: Not reported
Identification	**Sponsorship source:** This work was supported by the TrygFonden (1190-09), Nordea Foundation (Healthy Ageing grant), Health Foundation (2009B097), Danish Rheumatism Association (R56-Rp2380), Lundbeck Foundation (FP50/2009), School of Physical Therapy in Copenhagen,The Association of Danish Physiotherapists Research Fund. **Country:** Denmark **Setting:** **Comments:** **Authors name:** Bieler, 2013 **Institution:** Musculoskeletal Rehabilitation Research Unit, Department of Physical & Occupational Therapy, Copenhagen University Hospital, Bispebjerg, Denmark. Institute of Sports Medicine Copenhagen, Copenhagen University Hospital, Bispebjerg and Center for Healthy **Email:** tbie0001@bbh.regionh.dk **Address:**
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Blinding of outcome assessors All outcomes	Low risk	Judgement Comment: Blinded outcome assessor
Blinding of outcome assessors Patient reported outcome (primary)	Unclear risk	n
Blinding of outcome assessors Leg extensor power (data not used)	Unclear risk	n
Blinding of participants and personnel	High risk	Judgement Comment: Patiens and personnel not blinded
Other sources of bias	Low risk	Judgement Comment: Double testing of physical outcomes at baseline to account for learning effect. No intention-to-treat analysis (however performed for the published paper)
Incomplete outcome data	Low risk	Judgement Comment: 4% drop out in intervention group and 17% drop out in control group. Total of 11% drop out
Allocation concealment	Low risk	Quote: "This procedure was conducted by a member of the research team, who was not involved in assessment or training of the participants." Judgement Comment: Randomisation procedure handled by team members not otherwise involved
Sequence Generation	Low risk	Quote: "This procedure was conducted by a member of the research team, who was not involved in assessment or training of the participants."
Selective outcome reporting	Low risk	Judgement Comment: None apparent, pre-registered trial

Foley 2003

Methods	
Participants	
Interventions	
Outcomes	

Identification	
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Blinding of outcome assessors All outcomes	Unclear risk	Blinded outcomes assessor, but participant self reported pain and function (Fransen 2014)
Blinding of outcome assessors Patient reported outcome (primary)	Unclear risk	
Blinding of outcome assessors Leg extensor power (data not used)	Unclear risk	
Blinding of participants and personnel	High risk	Fra SR Fransen 2014
Other sources of bias	Unclear risk	About 40% on orthopaedic waiting list Exercise for. Fra SR Fransen 2014
Incomplete outcome data	Low risk	Fra SR Fransen 2014
Allocation concealment	Low risk	Fra SR Fransen 2014
Sequence Generation	Low risk	Fra SR Fransen 2014
Selective outcome reporting	Unclear risk	Fra SR Fransen 2014

Hermann 2016

Methods	**Study design:** Randomized controlled trial **Study grouping:** Parallel group **Open Label:** **Cluster RCT:**

Participants	**Baseline Characteristics** Intervention Control **Included criteria:** Eligible participants were: All patients diagnosed with primary hip OA aged 50 years or older, scheduled for THA at the Department of Orthopaedic Surgery, Herlev University Hospital, Copenhagen, Denmark **Excluded criteria:** Exclusion criteria were: Rheumatoid arthritis and other types of arthritis not diagnosed as OA, uraemia, cancer, treatment with sys-temic glucocorticoids>3 months the last 5 years with a dose >/=5mg, present or previous hip fracture (either side), other lower extremity fracture within 1 year prior to inclusion, body weight>135 kg, severe walking deficits (dependency of two crutches or walker for mobilization), or not speaking Danish language. **Pretreatment:**
Interventions	**Intervention Characteristics** Intervention ● *Exercise description*: Progressive explosive-type RT performed unilaterally on training machines: Hip extension, knee extension, knee flexion and leg press. ● *Intensity + supervision*: Group-based supervision by experienced PTs. The participants were encouraged to perform the maximum number of repetitions possible within each series. If the number of repetitions was below 8 or exceeded 12, the loading was adjusted for the next series. To apply with the principles of explosive-type RT the participants were instructed to complete the concentric phase of the movement 'as fast aspossible', then pause briefly, and complete the eccentric phase of the movement in approximately 2-3 s ● *Dose (no of sets and sessions, duration of intervention)*: Resistance Training program consisting of three sets of 8-12 repetitions of each exercise twice a week for 10 weeks = 20 sessions. Each session lasted 1 h. Control ● *Exercise description*: The control group received 'care as usual', which besides the standardized pre-operative information by the hip surgeon, included a meeting at the Department of Orthopaedic Surgery held by nurses and physiotherapists and a handout suggesting low-intensity home-based training program without specific RT exercises. ● *Intensity + supervision*: Home-based exercise. No supervision ● *Dose (no of sets and sessions, duration of intervention)*: Low intensity home-based exercises suggested by handouts

Outcomes	*Patientrapporteret funktionsevne* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Fully reported ● **Scale**: HOOS ADL ● **Range**: 0-100 ● **Unit of measure**: Points ● **Direction**: Higher is better ● **Data value**: Endpoint *Præstationsbaseret funktionsevne* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Not reported *Smerte (hofte)* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Fully reported ● **Scale**: HOOS Pain ● **Range**: 0-100 ● **Unit of measure**: Points ● **Direction**: Higher is better ● **Data value**: Endpoint *Helbredsrelateret livkvalitet* ● **Outcome type**: ContinuousOutcome ● **Reporting**: Fully reported ● **Scale**: HOOS QOL ● **Range**: 0-100 ● **Unit of measure**: Points ● **Direction**: Higher is better ● **Data value**: Endpoint *Træningsinducerede skader i bevægeapparatet* ● **Outcome type**: AdverseEvent ● **Reporting**: Partially reported ● **Data value**: Endpoint

	● **Notes**: Only reported for intervention group *Smerte (ikke hofterelateret)* ● **Outcome type**: AdverseEvent ● **Reporting**: Partially reported ● **Data value**: Endpoint ● **Notes**: Only reported for intervention group
Identification	**Sponsorship source:** the Danish Rheumatism Association (project no: R87-A1408) **Country:** Denmark **Setting:** **Comments:** **Authors name:** Hermann, 2016 **Institution:** **Email:** **Address:**
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Blinding of outcome assessors All outcomes	Unclear risk	n
Blinding of outcome assessors Patient reported outcome (primary)	Low risk	Quote: "major limitation to the study is the risk of assessor bias, i.e., a combined test and training site was used which made sufficient masking impossible. Assessor bias may cause invalid conclusions regarding the intervention effect 48. In order to diminish this source of bias, a standardized protocol was followed strictly during the collection of muscle power outcomes. Moreover, the HOOS ques- tionnaire which included the primary endpoint was a patient- reported outcome and answered without involvement by the assessor and therefore should not be subject to assessor bias. The data registration was performed blinded for allocation by a third person otherwise no involved in the study."

Blinding of outcome assessors Leg extensor power (data not used)	High risk	Judgement Comment: Data not used
Blinding of participants and personnel	High risk	Judgement Comment: Not possible to blind
Other sources of bias	Low risk	Quote: "The shorter time of up to 6 weeks to surgery in the control group may hamper the internal validity. On the other hand this has strengthened the external validity as this would happen in the daily clinic." Judgement Comment: Maybe some selection bias leading to low generalisability as only 40 % of eligible patient accepted participation (80 out of 210)
Incomplete outcome data	Low risk	Quote: "Three patients were lost to follow-up: One patient (control) dropped out after baseline due to unwillingness to further testing and one patient (intervention) dropped out between baseline and start up of intervention due to the delay of surgery in the inter- vention group compared to care-as-usual. One patient (inter- vention) was excluded due to medical illness not related to the study (pneumonia). There"
Allocation concealment	Low risk	Quote: "numbered closed envelopes containing allocation was produced by a person not otherwise affiliated with the study and concealed from the person enrolling the patients."
Sequence Generation	Low risk	Quote: "A com- puter generated randomization sequence was used and sequen- tially numbered closed envelopes containing allocation was produced by a person not otherwise affiliated with the study and concealed from the person enrolling the patients."
Selective outcome reporting	Low risk	Judgement Comment: No sign of selective outcome reporting

Footnotes

Summary of findings tables

Additional tables

References to studies

Included studies

Bieler 2013

Bieler,Theresa; Magnusson,Peter; Kjaer,Michael; Beyer,Nina. The effects of supervised strength training or Nordic walking and unsupervised home exercisein older people with hip osteoarthritis. A randomized trial.. Muscle function and exercise in older people with osteoarthritis of the hip. PhD thesis / Theresa Bieler 2013;(Book, Section):118. [DOI:]

Foley 2003

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Hermann 2016

Hermann A.; Holsgaard-Larsen A.; Zerahn B.; Mejdahl S.; Overgaard S.. Preoperative progressive explosive-type resistance training is feasible and effective in patients with hip osteoarthritis scheduled for total hip arthroplasty - a randomized controlled trial. Osteoarthritis and Cartilage 2016;24(1):91-98. [DOI:]

Excluded studies

Abbott 2013

Abbott J.H.; Robertson M.C.; Chapple C.; Pinto D.; Wright A.A.; Leon de la,Barra S.; Baxter G.D.; Theis J.-C.; Campbell A.J.. Manual therapy, exercise therapy, or both, in addition to usual care, for osteoarthritis of the hip or knee: A randomized controlled trial. 1: Clinical effectiveness. Osteoarthritis and Cartilage 2013;21(4):525-534. [DOI:]

Bennell 2014

Bennell K.L.; Egerton T.; Martin J.; Abbott J.H.; Metcalf B.; McManus F.; Sims K.; Pua Y.-H.; Wrigley T.V.; Forbes A.; Smith C.; Harris A.; Buchbinder R.. Effect of physical therapy on pain and function in patients with hip osteoarthritis: A randomized clinical trial. 2014;311(19):1987-1997. [DOI:]

Fukumoto 2014

Fukumoto Y.; Tateuchi H.; Ikezoe T.; Tsukagoshi R.; Akiyama H.; So K.; Kuroda Y.; Ichihashi N.. Effects of high-velocity resistance training on muscle function, muscle properties, and physical performance in individuals with hip osteoarthritis: a randomized controlled trial. Clinical rehabilitation 2014;28(1):48-58. [DOI:]

Jigami 2012

Jigami H.; Sato D.; Tsubaki A.; Tokunaga Y.; Ishikawa T.; Dohmae Y.; Iga T.; Minato I.; Yamamoto N.; Endo N.. Effects of weekly and fortnightly therapeutic exercise on physical function and health-related quality of life in individuals with hip osteoarthritis. Journal of Orthopaedic Science 2012;17(6):737-744. [DOI:]

Krauss 2014

Krauss I.; Steinhilber B.; Haupt G.; Miller R.; Martus P.; Janssen P.. Exercise therapy in hip osteoarthritis--a randomized controlled trial. Deutsches Arzteblatt international 2014;111(35-36):592-599. [DOI:]

Oosting 2012

Oosting E.; Jans M.P.; Dronkers J.J.; Naber R.H.; Dronkers-Landman C.M.; Appelman-De,Vries S.; Van,Meeteren N.. Preoperative home-based physical therapy versus usual care to improve functional health of frail older adults scheduled for elective total hip arthroplasty: A pilot randomized controlled trial. Archives of Physical Medicine and Rehabilitation 2012;93(4):610-616. [DOI:]

Teirlinck 2016

Teirlinck C.H.; Luijsterburg P.A.J.; Dekker J.; Bohnen A.M.; Verhaar J.A.N.; Koopmanschap M.A.; van,Es P.; Koes B.W.; Bierma-Zeinstra S.M.A.. Effectiveness of exercise therapy added to general practitioner care in patients with hip osteoarthritis: A pragmatic randomized controlled trial. Osteoarthritis and Cartilage 2016;24(1):82-90. [DOI:]

Villadsen 2014

Villadsen A.; Overgaard S.; Holsgaard-Larsen A.; Christensen R.; Roos E.M.. Immediate efficacy of neuromuscular exercise in patients with severe osteoarthritis of the hip or knee: A secondary analysis from a randomized controlled trial. Journal of Rheumatology 2014;41(7):1385-1394. [DOI:]

Williams 2013

Williams,Paul T.. Effects of Running and Walking on Osteoarthritis and Hip Replacement Risk. Medicine & Science in Sports & Exercise 2013;45(7):1292-1297 6p. [DOI: 10.1249/MSS.0b013e3182885f26]

Zeng 2015

Zeng R.; Lin J.; Wu S.; Chen L.; Chen S.; Gao H.; Zheng Y.; Ma H.. A randomized controlled trial: Preoperative home-based combined Tai Chi and Strength Training (TCST) to improve balance and aerobic capacity in patients with total hip arthroplasty (THA). Archives of Gerontology and Geriatrics 2015;60(2):265-271. [DOI:]

Studies awaiting classification

Ongoing studies

Other references

Additional references

Other published versions of this review

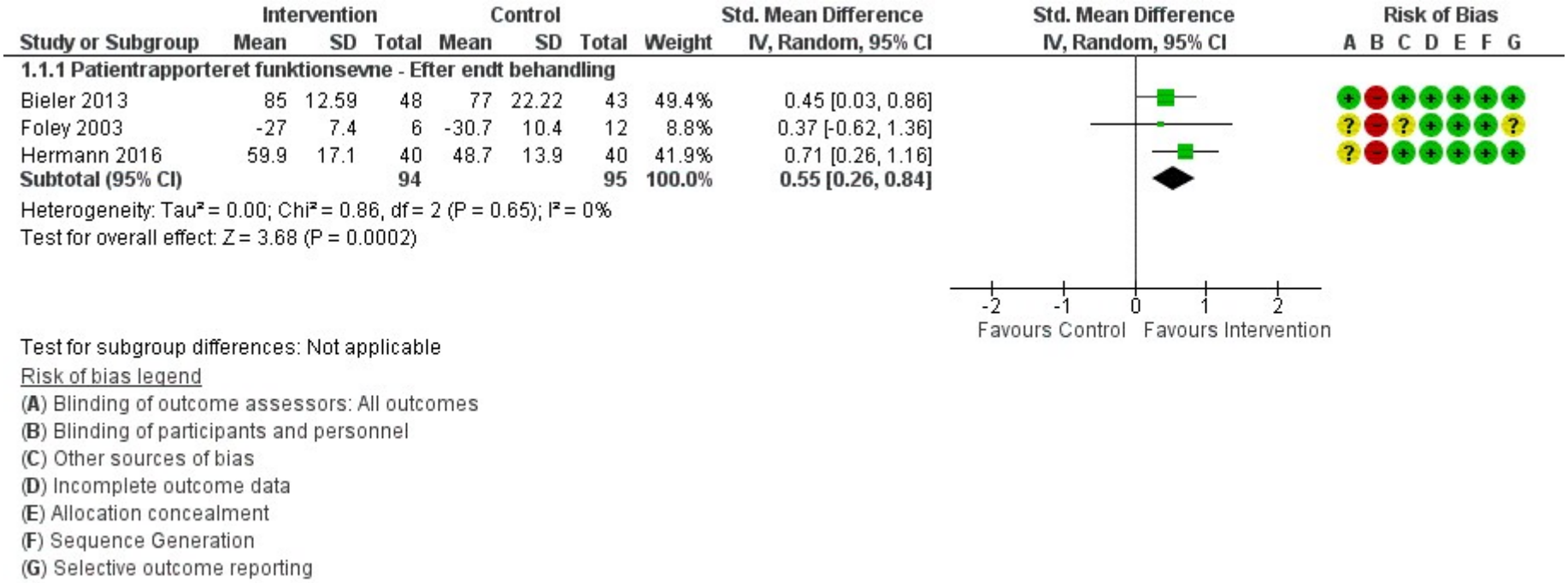
Data and analyses

1 Intervention vs Control

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
1.1 Patientrapporteret funktionsevne	3		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1.1 Patientrapporteret funktionsevne - Efter endt behandling	3	189	Std. Mean Difference (IV, Random, 95% CI)	0.55 [0.26, 0.84]
1.2 Præstationsbaseret funktionsevne	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.2.1 Præstationsbaseret funktionsevne - Efter endt behandling	1	91	Mean Difference (IV, Fixed, 95% CI)	-0.90 [-2.88, 1.08]
1.3 Smerte (hofte)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.3.1 Smerte (hofterelateret) - Efter endt behandling	3	189	Mean Difference (IV, Random, 95% CI)	8.16 [3.19, 13.14]
1.4 Helbredsrelateret livkvalitet	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.4.1 Helbredsrelateret livkvalitet - Efter endt behandling	2	171	Mean Difference (IV, Random, 95% CI)	6.80 [1.96, 11.63]
1.5 Antal træningsrelaterede skader	1	80	Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

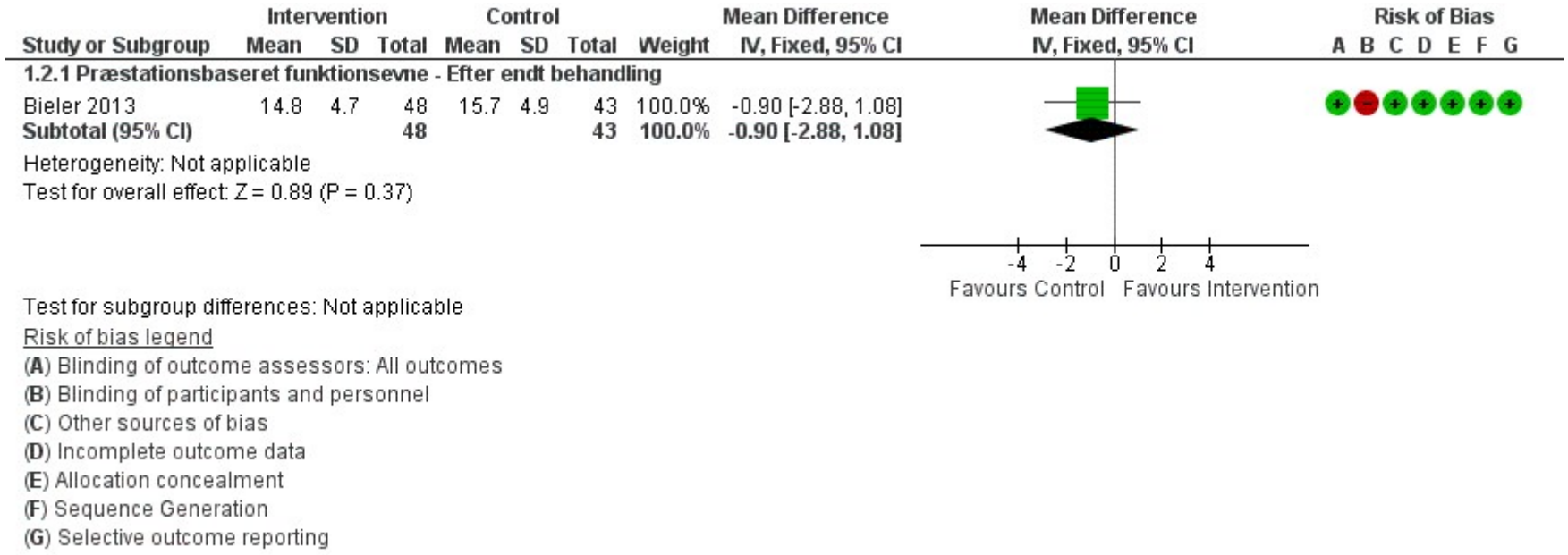
Figures

Figure 1 (Analysis 1.1)



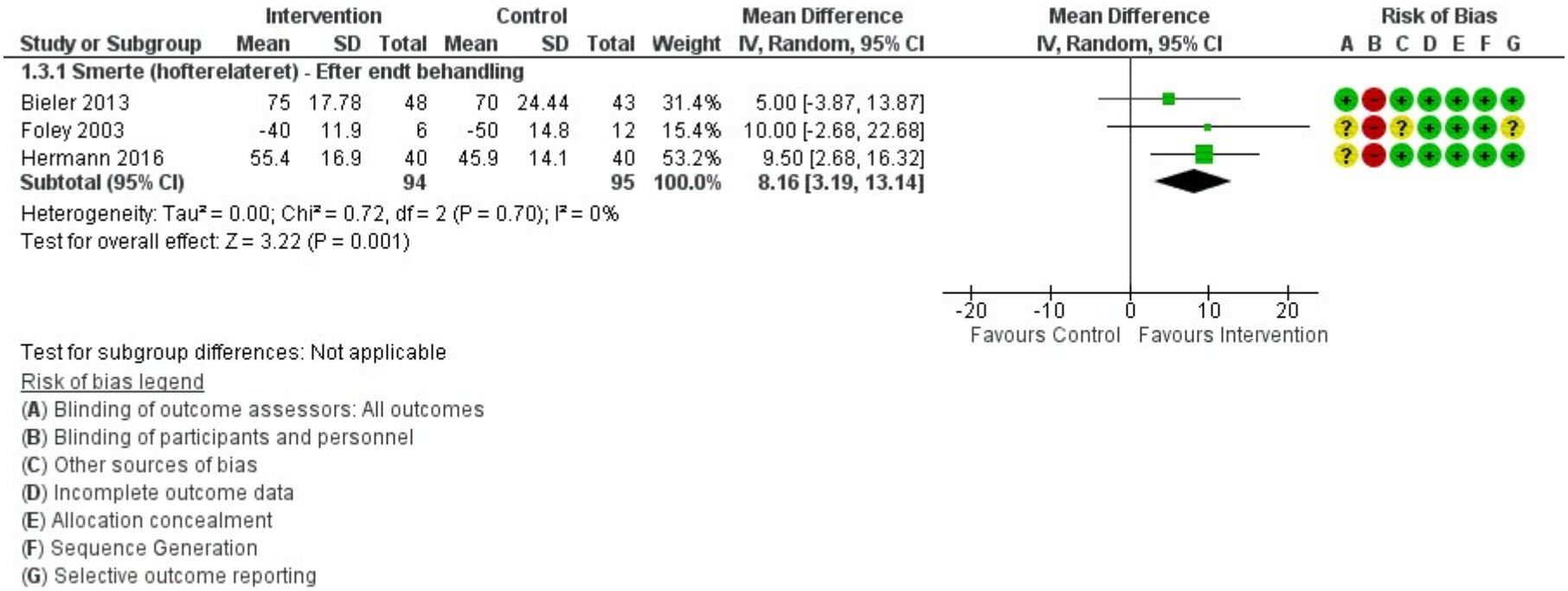
Forest plot of comparison: 1 Intervention vs Control, outcome: 1.1 Patientrapporteret funktionsevne.

Figure 2 (Analysis 1.2)



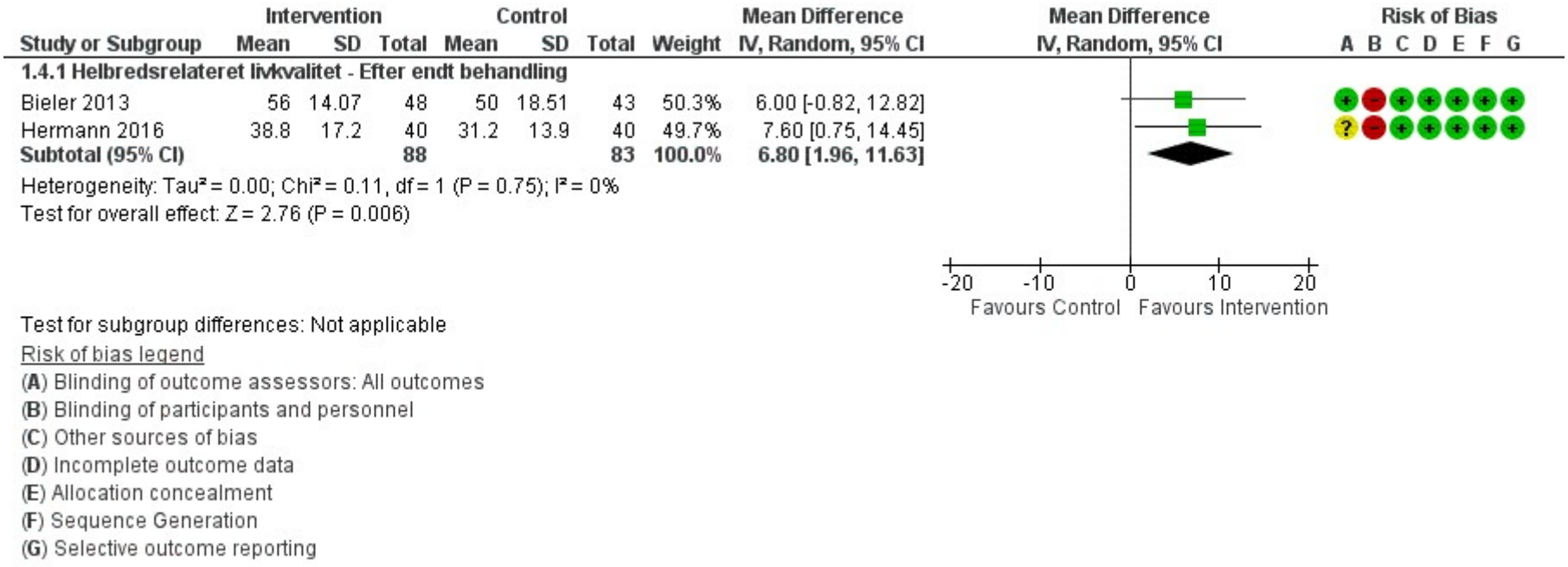
Forest plot of comparison: 1 Intervention vs Control, outcome: 1.2 Præstationsbaseret funktionsevne.

Figure 3 (Analysis 1.3)



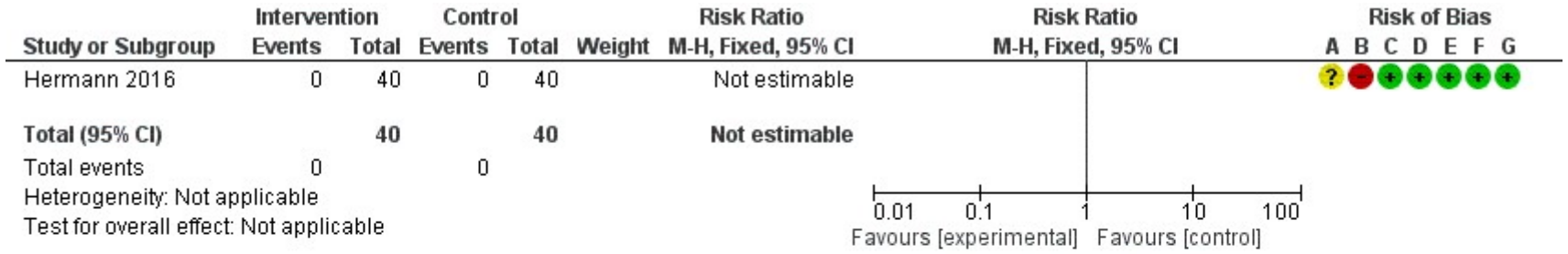
Forest plot of comparison: 1 Intervention vs Control, outcome: 1.3 Smerte (hofte).

Figure 4 (Analysis 1.4)



Forest plot of comparison: 1 Intervention vs Control, outcome: 1.4 Helbredsrelateret livkvalitet.

Figure 5 (Analysis 1.5)



Risk of bias legend
(**A**) Blinding of outcome assessors: All outcomes
(**B**) Blinding of participants and personnel
(**C**) Other sources of bias
(**D**) Incomplete outcome data
(**E**) Allocation concealment
(**F**) Sequence Generation
(**G**) Selective outcome reporting

Forest plot of comparison: 1 Intervention vs Control, outcome: 1.5 Antal træningsrelaterede skader.