## SUPPLEMENTARY MATERIAL

**Online Supplement 1**. Full literature search strategy.

Literature search strategy used: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

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1 exp Exercise/ or Athletes/ or exp Exercise Movement Techniques/ or Physical Exertion/ or exp Exercise Therapy/ or exp Sports/ or Motor Activity/ or (exercise or physical\* activ\* or strenuous activit\* or running or walk or walking or plyometric\* or yoga or tai chi or weight training or resistance training or swim\* or sport\* or athlet\* or mvpa or ltpa or stretching).ti,ab,kf. or ((muscle or muscular or strength\*) adj2 conditioning).ti,ab,kf. or (weight\* adj2 lift\*).ti,ab,kf.

2 exp Pregnancy/ or exp Pregnancy Complications/ or pregnan\*.ti,ab,hw,kf. or exp Pregnancy Trimesters/ or Peripartum Period/ or (antenatal or prenatal or perinatal or prepartum or antepartum or pre partum or ante partum or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or pre-eclampsi\* or preeclampsi\* or umbilical blood flow or umbilical arter\* flow).ti,ab,kf. or (exp Uterus/ and exp Regional Blood Flow/) or (uterine blood flow or uterine circulation).ti,ab,kf.

3 (maternal adj5 (blood pressure or hypotensi\* or heart rate\* or bradycardia or cardiac output\* or stroke volume or blood flow or circulation or arter\* flow or oxygen saturation or oxygen delivery or h?emodynamic\* or peripheral resistance or diastolic or systolic)).ti,ab,kf. or (maternal.mp. and exp Cardiac Output/)

4 exp Fetus/ or exp Fetal Diseases/ or fetal weight/ or birth weight/ or infant, low birth weight/ or infant, small for gestational age/ or infant, very low birth weight/ or infant, extremely low birth weight/ or infant, premature/ or infant, extremely premature/ or (fetus or f?etal or ((premature or preterm) adj3 (birth\* or delivery or labo?r or infant\*)) or birthweight or birth weight or "small for gestational age" or sga or intrauterine growth restriction or iugr).ti,ab,kf.

5 2 or 3 or 4

6 1 and 5

7 exp Pregnancy/ or pregnan\*.ti,ab,hw,kf. or exp Pregnancy Trimesters/ or Peripartum Period/ or (antenatal or prenatal or perinatal or prepartum or antepartum or pre partum or ante partum or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or f?etal or f?etus).ti,ab,kf. or exp Fetus/ or exp Fetal Diseases/

8 (complication\* or death or mortality or morbidity or adverse).ti,ab,kf. or (ae or co).fs.

- 9 7 and 8
- 10 (stillbirth or miscarriage).mp.
- 11 9 or 10
- 12 1 and 11
- 13 6 or 12

14 Supine Position/ or posture/ or (((lie or lying) adj2 (flat or down or horizontal\* or 30 degree\* or thirty degree\*)) or ((horizontal\* adj2 position\*) or reclin\* or supine or recumbant)).ti,ab,kf. or (standing position\* or 60 degree\* pr sixty degree\* or upright position\* or left lateral or (body adj3 position\*)).ti,ab,kf.

15 13 and 14

16 (exercis\* adj5 position\*).ti,ab,kf. or (crunch or crunches or "sit up\*" or "situp\* or v-sit\*" or bench press\* or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*").ti,ab,kf.

- 17 (5 or 11) and 16
- 18 15 or 17
- 19 animals/ not (humans/ and animals/)
- 20 18 not 19
- 21 remove duplicates from 20

### Ovid Embase <1974 to 2017 to Current>

Database: Embase <1974 to 2017 November 08> Search Strategy:

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1 exp exercise/ or athlete/ or exp kinesiotherapy/ or exp sport/ or exp physical activity/ or (exercise or physical\* activ\* or running or plyometric\* or yoga or tai chi or weight training or resistance training or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching).ti,ab,kw. or (weight\* adj2 lift\*).ti,ab,kw. or ((muscle or muscular or strength\*) adj2 conditioning).ti,ab,kw.

2 exp Pregnancy/ or exp Pregnancy Complication/ or pregnan\*.ti,ab,hw,kw. or exp Pregnancy Trimesters/ or Peripartum Period/ or Fetus/ or exp Fetus Disease/ or uterus blood flow/ or (antenatal or prenatal or perinatal or prepartum or antepartum or pre partum or ante partum or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or pre-eclampsi\* or preeclampsi\* or umbilical blood flow or umbilical arter\* flow or uterine blood flow or uterine circulation).ti,ab,kw.

3 (maternal adj5 (blood pressure or hypotensi\* or heart rate\* or bradycardia or cardiac output\* or stroke volume or blood flow or circulation or arter\* flow or oxygen saturation or oxygen delivery or h?emodynamic\* or peripheral resistance or diastolic or systolic)).ti,ab,kw. or (maternal.mp. and heart output/)

4 birth weight/ or low birth weight/ or small for date infant/ or exp very low birth weight/ or prematurity/ or fetus weight/ or (fetus or f?etal or ((premature or preterm) adj3 (birth\* or delivery or labo?r or infant\*))).ti,ab,kw. or (birthweight or birth weight or "small for gestational age" or sga or intrauterine growth restriction or iugr).ti,ab,kw.

- 5 2 or 3 or 4
- 6 1 and 5

7 exp Pregnancy/ or pregnan\*.ti,ab,hw,kw. or exp Pregnancy Trimesters/ or Peripartum Period/ or Fetus/ or (antenatal or prenatal or perinatal or prepartum or antepartum or pre partum or ante partum or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or f?etus or f?etal).ti,ab,kw.

8 (complication\* or death or mortality or morbidity or adverse).ti,ab,kw. or (ae or co).fs.

- 9 7 and 8
- 10 (stillbirth or miscarriage).mp.
- 11 9 or 10
- 12 1 and 11
- 13 6 or 12

14 body position/ or supine position/ or (((lie or lying) adj2 (flat or down or horizontal\* or 30 degree\* or thirty degree\*)) or ((horizontal\* adj2 position\*) or reclin\* or supine or recumbent)).ti,ab,kw. or (standing position\* or 60 degree\* or sixty degree\* or upright position\* or left lateral or (body adj3 position\*)).ti,ab,kw.15 13 and 14

16 (exercis\* adj5 position\*).ti,ab,kw. or (crunch or crunches or "sit up\*" or "situp\* or v-sit\*" or bench press\* or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*").ti,ab,kw.

17 (5 or 11) and 16

18 15 or 17

19 animal/ not (human/ and animal/)

20 18 not 19

21 remove duplicates from 20

# PsycINFO <1806 to Current>

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1 physical activity/ or exp exercise/ or activity level/ or athletes/ or exp sports/ or ((exercise or physical\* activ\* or strenuous activit\* or running or plyometric\* or yoga or tai chi or weight training or resistance training or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching).ti,ab,id. or ((weight\* adj2 lift\*) or ((muscle or muscular or strength\*) adj2 conditioning))).ti,ab,id.

2 exp pregnancy/ or exp obstetrical complications/ or pregnan\*.ti,hw,ab,id. or (antenatal or prenatal or prepartum or antepartum or pre partum or ante partum or trimester\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or pre-eclampsi\* or preeclampsi\* or umbilical blood flow or umbilical arter\* flow or uterine blow flow or uterine circulation).ti,ab,id.

3 (maternal adj5 (blood pressure or hypotensi\* or heart rate\* or bradycardia or cardiac output\* or blood flow or circulation or arter\* flow or oxygen saturation or oxygen delivery or h?emodynamic\* or peripheral resistance or diastolic or systolic)).ti,ab,id.

4 prenatal developmental stages/ or prenatal development/ or fetus/ or premature birth/ or birth weight/

5 (fetus or f?etal or ((premature or preterm) adj3 (birth\* or delivery or labo?r or infant\*)) or birthweight or birth weight or "small for gestational age" or sga or intrauterine growth restriction or iugr).ti,ab,id.

6 2 or 3 or 4 or 5

7 1 and 6

8 exp pregnancy/ or pregnan\*.ti,hw,ab,id. or (antenatal or prenatal or prepartum or antepartum or pre partum or ante partum or trimester\* or primigravid\* or primiparous or multiparous or multiparous or multiparous or bestetric\* or gestation\*).ti,ab,id.

9 (complication\* or death or mortality or morbidity or adverse).ti,ab,id.

- 10 8 and 9)
- 11 (miscarriage or stillbirth).mp.
- 12 10 or 11
- 13 1 and 12
- 14 7 or 13

15 posture/ or (((lie or lying) adj2 (flat or down or horizontal\* or 30 degree\* or thirty degree\*)) or ((horizontal\* adj2 position\*) or reclin\* or supine or recumbent)).ti,ab,id. or (standing position\* or 60 degree\* or sixty degree\* or upright position\* or left lateral or (body adj3 position\*)).ti,ab,id.

16 14 and 15

17 (exercis\* adj5 position\*).ti,ab,id. or (crunch or crunches or "sit up\*" or "situp\* or v-sit\*" or bench press\* or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*").ti,ab,id.

- 18 (6 or 12) and 17
- 19 16 or 18
- 20 limit 19 to human

### **CINAHL Plus with Full-text, 1937-Current**

S1 ( (MH "Exercise+") OR (MH "Athletes+") OR (MH "Therapeutic Exercise+") OR (MH "Physical Fitness+") OR (MH "Physical Activity") OR (MH "Physical Endurance+") OR (MH "Exertion+") OR (MH "Sports+") OR (MH "Yoga+") OR (MH "Tai Chi") ) OR ( exercise or "physical\* activ\*" or "strenuous activit\*" or running or plyometric\* or yoga or "tai chi" or "weight training" or "resistance training" or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching or "aerobic capacity" or fitness or weight\* n2 lift\* or (muscle or muscular or strength\*) n2 conditioning )

S2 ( (MH "Pregnancy Complications+") OR (MH "Pregnancy Outcomes") OR (MH "Pregnancy Trimesters+") OR (MW pregnan\*) ) OR ( antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or gestation\* or "pre-eclampsi\*" or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow" or "uterine blood flow" or "uterine circulation" ) OR ( maternal n5 ("blood pressure" or hypotensi\* or "heart rate\*" or bradycardia or "cardiac output\*" or "blood flow" or circulation or" arter\* flow" or "oxygen saturation" or hemodynamic\* or haemodynamic\* or "oxygen delivery" or "peripheral resistance" or diastolic or systolic) ) OR ( maternal and (MH "Cardiac Output+") ) OR ( (MH "Fetus+") OR (MH "Fetal Abnormalities") or (MH "Fetal Circulation") ) OR ( fetus OR foetal or ((premature or preterm) w3 (birth\* or delivery or labor or infant\*)) or birthweight or "birth weight" or "small for gestational age" or sga or "intrauterine growth restriction" or iugr ) OR ((MH "Blood Circulation") AND (MH "Uterus+"))

S3 S1 AND S2

S4 ((MH "Pregnancy Trimesters+") OR (MW pregnan\*) or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or (MH "Fetus+") or fetus OR foetal) AND (complication\* or death or mortality or morbidity or adverse) S5 miscarriage OR stillbirth

- S6 S4 OR S5
- S7 S1 AND S6
- S8 S3 OR S7

S9 (MH "Supine Position") OR (MH "Body Positions+") OR (supine or "left lateral" or reclin\* or recumbent or (lie or lying) n2 (flat or down or horizontal\*) OR (horizontal\* or sleep\* or rest\* or body) n2 position\* or "standing position\*" or "60 degree\*" or "sixty degree\*" or "upright position\*" or "left lateral" or (body w3 position\*) or crunch or crunches or "sit up\*" or "situp\*" or "v-sit\*" or "bench press\*" or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*")

S10 S8 AND S9
S11 (MH "Exercise Positions+") or exercis\* n5 position\*
S12 S2 and S11
S13 S10 or S12

#### SportDiscus, ERIC, Child Development & Adolescent Studies

S1 exercise or "physical\* activ\*" or "strenuous activit\*" or running or plyometric\* or yoga or "tai chi" or "weight training" or "resistance training" or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching or "aerobic capacity" or fitness or weight\* n2 lift\* or (muscle or muscular or strength\*) n2 conditioning

S2 pregnan\* or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or "pre-eclampsi\*" or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow" or "uterine blood flow" or "uterine circulation" or fetus or foetus or fetal or foetal or (premature or preterm) w3 (birth\* or delivery or labor or infant\*) or birthweight or "birth weight " or "small for gestational age" or sga or "intrauterine growth restriction" or iugr or "pre-eclampsi\*" or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow" or maternal n5 (blood pressure or hypotensi\* or "heart rate\*" or bradycardia or "cardiac output\*" or "blood flow" or circulation or" arter\* flow" or "oxygen saturation" or "oxygen delivery" or "peripheral resistance" or diastolic or systolic) or miscarriage OR stillbirth S3 supine or "left lateral" or recumbent or (lie or lying) n2 (flat or down or horizontal\*) OR (horizontal or sleep\* or rest\* or body) n2 position or "standing position\*" or "60 degree\*" or "upright position\*" or "left lateral" or crunch or crunches or "sit up\*" or "situp\*"or "v-sit\*" or "bench press\*" or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*"

S4 S1 AND S2 AND S3S5 exercis\* n5 position\*S6 S2 and S5S7 S4 OR S6

#### Scopus

(((TITLE (exercise OR "physical\* activ\*" OR "strenuous activit\*" OR running OR plyometric\* OR yoga OR "tai chi" OR "weight training" OR "resistance training" OR swim\* OR sport\* OR athlet\* OR walk OR walking OR mvpa OR ltpa OR stretching OR "aerobic capacity" OR fitness OR (weight\* W/2 lift\*) OR ((muscle OR muscular OR strength\*) W/2 conditioning)) OR (KEY (exercise OR "physical\* activ\*" OR "strenuous activit\*" OR running OR plyometric\* OR yoga OR "tai chi" OR "weight training" OR "resistance training" OR swim\* OR sport\* OR athlet\* OR walk OR walking OR mvpa OR ltpa OR stretching OR "aerobic capacity" OR fitness OR (weight\* W/2 lift\*) OR ((muscle OR muscular OR strength\*) W/2 conditioning)))) AND TITLE-ABS-KEY (supine OR "left lateral" OR reclin\* OR degree\* OR recumbent OR (( lie OR lying) W/2 (flat OR down OR horizontal\*)) OR ((horizontal\* OR sleep\* OR rest\* OR body) W/2 position\*) OR "standing position\*" OR "60 degree\*" OR OR "sixty degree\*" OR "upright position\*" OR "left lateral" OR "body position\*" )) AND ((

TITLE-ABS-KEY (pregnan\* OR antenatal OR prenatal OR perinatal OR prepartum OR antepartum OR "pre partum" OR "ante partum" OR primigravid\* OR primiparous OR multiparous OR multigravid\* OR trimester\* OR obstetric\* OR gestation\* OR fetus OR foetus OR fetal OR foetal OR birthweight OR "birth weight" OR "small for gestational age" OR sga OR "intrauterine growth restriction" OR iugr OR "pre-eclampsi\*" OR preeclampsi\* OR "umbilical blood flow" OR "umbilical arter\* flow" OR "uterine blood flow" OR "uterine circulation" OR miscarriage OR stilbirth ) ) OR (TITLE-ABS-KEY (( premature OR preterm) PRE/3 (birth\* OR delivery OR labor OR infant\*))) OR ( TITLE-ABS-KEY (maternal W/5 ("blood pressure" OR hypotensi\* OR "heart rate\*" OR bradycardia OR "cardiac output\*" OR "blood flow" OR circulation OR " arter\* flow" OR "oxygen saturation" OR "oxygen delivery" OR "peripheral resistance" OR hemodynamic\* OR haemodynamic\* OR diastolic OR systolic)))) AND NOT TITLE-ABS-KEY ( animal\* OR cow OR cows OR bovine OR chicken\* OR rat OR rats OR mouse OR mice OR rodent\* OR sheep OR pig OR pigs OR swine OR dog OR dogs OR cat OR cats)) OR (TITLE-ABS-KEY ((exercis\* W/5 position\*) OR crunch OR crunches OR "sit up\*" OR "situp\*" OR "v-sit\*" OR "bench press\*" OR "shoulder bridge\*" OR "abdominal bridge\*" OR "hip raise\*" OR "leg lift\*") AND ((TITLE-ABS-KEY (pregnan\* OR antenatal OR prenatal OR prepartum OR antepartum OR "pre partum" OR "ante partum" OR primigravid\* OR primiparous OR multiparous OR multigravid\* OR trimester\* OR obstetric\* OR gestation\* OR fetus OR foetus OR fetal OR foetal OR birthweight OR "birth weight" OR "small for gestational age" OR sga OR "intrauterine growth restriction" OR iugr OR "pre-eclampsi\*" OR preeclampsi\* OR "umbilical blood flow" OR "umbilical arter\* flow" OR "uterine blood flow" OR "uterine circulation" OR miscarriage OR stilbirth)) OR (TITLE-ABS-KEY((premature OR preterm)) PRE/3 ( birth\* OR delivery OR labor OR infant\*))) OR (TITLE-ABS-KEY (maternal W/5 ( "blood pressure" OR hypotensi\* OR "heart rate\*" OR bradycardia OR "cardiac output\*" OR "blood flow" OR circulation OR " arter\* flow" OR "oxygen saturation" OR "oxygen delivery" OR "peripheral resistance" OR hemodynamic\* OR haemodynamic\* OR diastolic OR systolic)))))

### WOS CORE

#1 TS=(exercise or "physical\* activ\*" or "strenuous activit\*" or running or plyometric\* or yoga or "tai chi" or "weight training" or "resistance training" or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching or "aerobic capacity" or fitness or (weight\* near/2 lift\*) or ((muscle or muscular or strength\*) near/2 conditioning))

#2 TS=(pregnan\* or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or primigravid\* or primiparous or multiparous or multigravid\* or trimester\* or obstetric\* or gestation\* or fetus or foetus or fetal or foetal or ((premature or preterm) near/3 (birth\* or delivery or labor or infant\*)) or birthweight or "birth weight " or "small for gestational age" or sga or "intrauterine growth restriction" or iugr or "pre-eclampsi\*" or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow" or "uterine blood flow" or "uterine circulation" or (maternal near/5 ("blood pressure" or hypotensi\* or "heart rate\*" or bradycardia or "cardiac output\*" or "blood flow" or circulation or" arter\* flow" or "oxygen saturation")))

#3 #1 AND #2

#4 TS=(pregnan\* or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or primigravid\* or primiparous or multiparous or multigravid\* or trimester\* or obstetric\* or gestation\* or fetus or foetus or fetal or foetal) AND TS=(complication\* or death or mortality or morbidity or adverse) #5 TS=(stillbirth or miscarriage) #6 #4 OR #5 #7 #6 AND #1 #8 #3 OR #7 #9 TS=(supine or "left lateral" or reclin\* or recumbent or ((lie or lying) near/2 (flat or down or horizontal\*)) OR ((horizontal\* or sleep\* or rest\* or body) near/2 position\*) OR "standing position\*" or "60 degree\*" or "sixty degree" or "upright position\*" or "left lateral" or "body position\*" ) #10 #8 AND #9 #11 TS=((exercis\* near/5 position\*) or crunch or crunches or "sit up\*" or "situp\*" or "v-sit\*" or "bench press\*" or "shoulder bridge\*" or "abdominal bridge\*" or "hip raise\*" or "leg lift\*") #12 #2 OR #6 #13 #11 AND #12 #14 #10 OR #13

## Cochrane

#1 [mh Exercise] or [mh Athletes] or [mh "Exercise Movement Techniques"] or [mh "Physical Exertion"] or [mh "Exercise Therapy"] or [mh Sports] or [mh "Motor Activity"] or (exercise or "physical\* activ\*" or "strenuous activit\*" or running or walk or walking or plyometric\* or yoga or "tai chi" or "weight training" or "resistance training" or swim\* or sport\* or athlet\* or mvpa or ltpa or stretching):ti,ab,kw or ((muscle or muscular or strength\*) near/2 conditioning):ti,ab,kw or (weight\* near/2 lift\*):ti,ab,kw

#2 [mh Pregnancy] or [mh "Pregnancy Complications"] or [mh "Pregnancy Trimesters"] or [mh "Peripartum Period"] or (pregnan\* or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or trimester\* or obstetric\* or primigravid\* or primiparous or multiparous or multigravid\* or obstetric\* or gestation\* or pre-eclampsi\* or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow"):ti,ab,kw or ([mh Uterus] and [mh "Regional Blood Flow"]) or ("uterine blood flow" or "uterine circulation"):ti,ab,kw or (maternal near/5 ("blood pressure" or hypotensi\* or "heart rate\*" or bradycardia or "cardiac output\*" or "stroke volume" or "blood flow" or circulation or "arter\* flow" or "oxygen saturation" or "oxygen delivery" or "peripheral resistance" or diastolic or systolic)):ti,ab,kw or ((maternal):ti,ab,kw and [mh "Cardiac Output"])

#3 [mh Fetus] or [mh "Fetal Diseases"] or [mh "infant, low birth weight"] or [mh "infant, small for gestational age"] or [mh "infant, very low birth weight"] or [mh "infant, extremely low birth weight"] or [mh "infant, premature"] or [mh "infant, extremely premature"] or (fetus or foetus or fetal or foetal or ((premature or preterm) near/3 (birth\* or delivery or labor or infant\*)) or birthweight or birth weight or "small for gestational age" or sga or "intrauterine growth restriction" or iugr or stillbirth or miscarriage):ti,ab,kw

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#4 #2 or #3
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#5 #1 AND #4

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#6 [mh "Supine Position"] or [mh posture] or (((lie or lying) near/2 (flat or down or horizontal* )) or (horizontal* near/2 position*) or reclin* or supine or recumbent or "standing position*" or 60 degree* or "60 degree*" or "upright position*" or "left lateral" or "body position*" ):ti,ab,kw
#7 #5 AND #6
#8 ((exercis* near/5 position*) or crunch or crunches or "sit up*" or "situp*" or "v-sit*" or "bench press*" or "shoulder bridge*" or "abdominal bridge*" or "hip raise*" or "leg lift*"):ti,ab,kw
#9 #4 AND #8
#10 #7 OR #9
```

# TRIP

((title:(pregnan\* or antenatal or prenatal or perinatal or prepartum or antepartum or "pre partum" or "ante partum" or primigravid\* or primiparous or multiparous or multigravid\* or trimester\* or obstetric\* or gestation\* or fetus or foetus or fetal or foetal or premature or preterm or birthweight or "birth weight " or "small for gestational age" or sga or "intrauterine growth restriction" or iugr or "pre-eclampsi\*" or preeclampsi\* or "umbilical blood flow" or "umbilical arter\* flow" or "uterine blood flow" or "uterine circulation")) and title:(exercise or "physical\* activ\*" or "strenuous activit\*" or running or plyometric\* or yoga or "tai chi" or "weight training" or "resistance training" or swim\* or sport\* or athlet\* or walk or walking or mvpa or ltpa or stretching or "aerobic capacity" or fitness or "weight lift\*" or "muscle conditioning" or "cumbent or "lie down" or "lying down" or "lying flat" or "lying horizontal\*" or "horizontal\* position\*" or "body position\*" or "exercise position\*" or "60 degree\*" or "60 degree\*" or "abdominal bridge\*" or "leg lift\*")

### **Clinicaltrials.gov**

Due to limits on number of characters entered into the search box, two separate search statements were entered:

(pregnant OR pregnancy fetus OR foetus OR fetal OR foetal) AND (exercise OR "physical activity") AND (supine OR horizontal OR recumbent OR "left lateral" OR crunch OR crunches OR "sit up\*" OR "situp\*" OR "v-sit\*" OR "bench press\*")

(pregnant OR pregnancy fetus OR foetus OR fetal OR foetal) AND ("shoulder bridge\*" OR "abdominal bridge\*" OR "hip raise\*" OR "leg lift\*" OR "exercise position\*")

### Online Supplement 2. List of Excluded studies (N=58).

### Not Pregnant Women

1. Kouwaki M, Yokochi M, Kamiya T, Yokochi K. Spontaneous movements in the supine position of preterm infants with intellectual disability. Brain Dev. 2014; 36: 572-577.

2. Kruger JA, Dietz HP, Murphy BA. Pelvic floor function in elite nulliparous athletes. Ultrasound Obstet. Gynecol. 2007; 30: 81-85.

### No Supine Exercise

1. Havik H, Murphy BA, Kruger J. Effect of spinal manipulation on pelvic floor functional changes in pregnant and nonpregnant women: A preliminary study. J Manipulative Physiol Ther. 2016; 39: 339-347.

2. Leon-Larios F, Corrales-Gutierrez I, Casado-Mejía R, Suzrez-Serrano C. Influence of a pelvic floor training programme to prevent perineal trauma: A quasi-randomised controlled trial. Midwifery. 2017; 50: 72-77.

3. Söderberg G. Utero-vaginal differential pressure at rest and during physical efforts in early pregnancy. Acta Obstet Gyne Scand. 1972; 51: 371-373.

4. Higuchi H, Takagi S, Zhang K, Furui I, Ozaki M. Effect of lateral tilt angle on the volume of the abdominal aorta and inferior vena cava in pregnant and nonpregnant women determined by magnetic resonance imaging. Anesthesiology. 2015; 122: 286-293.

5. Baker JH, Rothenberger SD, Kline CE, Okun ML. Exercise during early pregnancy is associated with greater sleep continuity. Behav Sleep Med. 2016; DOI: 10.1080/15402002.2016.1228649

6. Barakat R, Ruiz JR, Stirling JR, Zakynthinaki M, Lucia A. Type of delivery is not affected by light resistance and toning exercise training during pregnancy: A randomized controlled trial. Am J Obstet Gynecol. 2009; 201:590.e1-6.

7. Bø K, Fleten C, Nystad W. Effect of antenatal pelvic floor muscle training on labor and birth. Am J Obstet Gynecol. 2009; 113: 1279-1284.

8. Bonzini M, Coggon D, Godfrey K, Inskip H, Crozier S, Palmer KT. Occupational physical activities, working hours and outcomes of pregnancy: Findings from the Southampton Women's Survey. Occup Environ Med. 2009; 66: 685-690.

9. Brotanek V, Sureau C. Exercise test as physiological form of antepartum stress test. Int J Gynaecol Obstet. 1985; 23: 327-333.

10. Carpenter RE, D'Silva LA, Emery SJ, Uzun O, Rassi D, Lewis MJ. Changes in heart rate variability and QT variability during the first trimester of pregnancy. Physiol Meas. 2015; 36: 531-545.

11. Carpenter RE, Uzun O, Emery SJ, Rassi D, Lewis MJ. Does moderate but regular exercise alters the baroreceptor response in pregnancy? Eur Heart J. 2015; 36: 469.

12. Carpenter RE, Emery SJ, Uzun O, D'Silva LA, Lewis MJ. Influence of antenatal physical exercise on haemodynamics in pregnant women: A flexible randomisation approach. BMC Pregnancy & Childbirth. 2015; 15: 186.

13. Clapp JF, Stepanchak W, Tomaselli J, Kortan M, Faneslow S. Portal vein blood flow-effects of pregnancy, gravity, an exercise. Am J Obstet Gynecol. 2000; 183: 167-172.

14. Barron WM, Mujais SK, Zinaman M, Bravi EL, Lindheimer MD. Plasma catecholamine responses to physiologic stimuli in normal human pregnancy. Am J Obstet Gynecol. 1986; 154: 80-84.

15. D'Silva LA, Davies RE, Emery SJ, Lewis MJ. Influence of somatic state on cardiovascular measurements in pregnancy. Physiol Meas. 2014; 35: 15-29.

16. de Barros MC, Lopes MAB, Francisco RPV, Sapienza AD, Zugaib M. Resistance exercise and glycemic control in women with gestational diabetes mellitus. Am J Obstet Gynecol. 2010; 203: 556.e1-6.

17. Lowe SA, Macdonald GJ, Brown MA. Regulation of atrial-natriuretic-peptide release in pregnancy – Responses to posture. Am J Obstet Gynecol. 1991; 165: 591-595.

18. Durak EP, Jovanovic-Peterson L, Peterson CM. Comparative evaluation of uterine response to exercise on five aerobic machines. Am J Obstet Gynecol.1990; 162: 754-756.

19. Ekholm EM, Piha SJ, Erkkola RU, Antila KJ. Autonomic cardiovascular reflexes in pregnancy: A longitudinal study. Clin Auton Res. 1994; 4: 161-165.

20. Elden H, Ostgaard H, Fagevik-Olsen M, Ladfors L, Hagberg H. Treatments of pelvic girdle pain in pregnant women: Adverse effects of standard treatment, acupuncture and stabilising exercises on the pregnancy, mother, delivery and the fetus/neonate. BMC Complementary and Alternative Medicine. 2008; 8: DOI: 10.1186/1472-6882-8-34.

21. Takito MY, Benício D, Latorre MdRdO. Maternal posture and its influence on birthweight. Rev Saùde Pùblica. 2005; 39: 325-332.

22. Erkkola R. The influence of physical training during pregnancy on physical work capacity and circulatory parameters. Scand J Clin Lab Invest. 1976; 36: 747-754.

23. Gau M, Chang C, Tian S, Lin K. Effects of birth ball exercise on pain and self-efficacy during childbirth: A randomised controlled trial in Taiwan. Midwifery. 2011; 27: e292-e300.

24. Gutke A, Kjellby-Wendt G, Oberg B. The inte-rater reliability of a standardised classification system for pregnancy-related lumbopelvic pain. Manual Therapy. 2010; 15: 13-18.

25. Guzman CA, Caplan R. Cardiorespiratory response to exercise during pregnancy. Am J Obstet Gynecol. 1970; 108: 600-605.

26. Haakstad LAH, Edvardsen E, Bø K. Effect of regular exercise on blood pressure in normotensive pregnant women: A randomized controlled trial. Hypertens Pregnancy. 2016; 35: 170-180.

27. Lekskulchai O. Effect of antenatal pelvic floor exercises on bladder neck descent in nulliparous pregnant women. Neurourol Urodyn. 2011; 30: 949-950.

28. Merati G, Rampichini S, Roselli M, Roveda E, Veicsteinas A, Pizzini G. Gravity and gravidity: Will microgravity assist pregnancy? Sports Sciences for Health. 2006; 2: 129-136.

28. Lekskulchai O, Wanichsetakul P. Effect of pelvic floor muscle training (PFMT) during pregnancy on bladder neck descend and delivery. J Med Assoc Thai. 2014; 97: S156-S163.

29. Ostgaard HC, Zetherstrom G, Roos-Hansson E, Svanberg B. Reduction of back and posterior pelvic pain in pregnancy. Spine. 1994; 19:894-900.

30. Pelaez M, Gonzalez-Cerron S, Montejo R, Barakat R. Pelvic floor muscle training included in a pregnancy exercise program is effective in primary prevention of urinary incontinence: A randomized controlled trial. Neurourol Urodyn. 2014l 33: 67-71.

31. Phelan S, Phipps MG, Abrams B, Darroch F, Schaffner A, Wing RR. Randomized trial of a behavioral intervention to prevent excessive gestational weight gain: The Fit for Delivery study. Am J Clin Nutr. 2011; 93: 772-779.

32. Pivarnik JM, Ayress NA, Mauer MB, Cotton DB, Kirshon B, Dildy GA. Effects of maternal aerobic fitness on cardiorespiratory responses to exercise. Med Sci Sports Exerc. 1993; 25: 993-998.

33. Polis RL, Gussman D, Kuo Y. Yoga in pregnancy. Obstet Gynecol. 2015; 126: 1237-1241.

34. Prabhu N. Effect of a exercise by pregnant women and birth weight: A randomized controlled trial. Journal of Evolution of Medical and Dental Science. 2015; 4: 1509-1516.

35. Ramirez-Velez R. Effect of regular aerobic exercise on endothelium-dependent vasodilation in pregnant women: A randomized controlled trial. Circulation. 2012; 125: p719.

36. Rogers MS, Hung C. Change in mean arterial pressure following isometric exercise in normotensive and hypertensive pregnancy: Validation of a continuous blood pressure monitor. Hypertension in Pregnancy. 1996; 15: 211-218.

37. Rogers MS, Todinson B. Change in cardiovascular indices with position and isometric exercise throughout pregnancy: Assessment by impedance cardiography and oscillometric sphygmomanometry. Hypertension in Pregnancy. 1998; 17: 191-202.

38. Tlapáková E, Jelen K, Minařková M. The relationship between pelvic inclination, exercise and low back pain (LBP) during pregnancy. Acta Univ Palacki Olomuc Gymn. 2011; 41: 15-21.

39. Tuffnell DJ, Buchan PC, Albert D, Tyndale-biscoe S. Fetal heart rate responses to maternal exercise, increased maternal temperature and maternal circadian variation. J Obstet Gynaecol. 1990; 10: 387-391.

40. Ueland K, Novy MJ, Metcalfe J. Cardiorespiratory responses to pregnancy and exercise in normal women and patients with heart disease. Obstetrics. 1973; 115: 4-10.

41. Ueland K, Novy MJ, Peterson EN, Metcalfe J. Maternal cardiovascular dynamics. Am J Obstet & Gynecol. 1969; 104: 856-864.

42. Stafne SN, Salvesen KA, Romundstad PR, Eggebo TM, Carlsen SM, Mørkved S. Regular exercise during pregnancy to prevent gestational diabetes. Am J Obstet Gynecol. 2012; 119: 29-36.

43. O'Neill ME, Cooper KA, Cook CM, Trudinger BJ, Boyce ES, Hunyor SN. The influence of exercise intensity on the umbilical artery flow velocity waveform and fetal heart rate responses to moderate duration, semi-supine cycling in late pregnancy. Aust J Sci Med Sport. 1991; 23: 101-104.

44. O'Neill ME, Cooper KA, Boyce ES, Hunyor SN. Postural effects when cycling in late pregnancy. Womens Birth. 2006; 19: 107-111.

45. Jędrfzejko M, Nowosielski K, Poręba R, Ulman-Wlodarz I, Bobiński R. Physical efficiency and activity energy expenditure in term pregnancy females measured during cardiopulmonary exercise tests with a supine cycle ergometer. J Matern Fetal Neonatal Med. 2016; 29: 3800-3805.

46. Cooper KA, O'Neill ME, Hunyor SN, Boyce ES. Hemodynamic responses of trained and sedentary pregnant women to semi-supine cycling. J Sports Med. 1993; 33: 203-204.

47. Carpenter RE, Emery SJ, Uzun O, Rassi D, Lewis MJ. Influence of antenatal physical exercise on heart rate variability and QT variability. J Matern Fetal Neonatal. 2017; 30: 79-84.

### **Outcomes Not Relevant**

1. Shim M, Lee Y, Oh H, Kim J. Effects of a back-pain-reducing program during pregnancy for Korean women: A non-equivalent control-group pretest-posttest study. Int J Nurs Stud. 2007; 44:19-28.

2. Botelho S, Marques J, Pereira L, Lanza AH, Hermann V, Palma P, Riccetto C. Can the abdominal and pelvic muscle training trigger the co-activation between the transversus abdominis/internal oblique muscle and the muscles of the pelvic floor during pregnancy and postpartum? Neurourol Urodyn. 2011; 30: 957-958.

3. Botelho S, Martinho N, Silva V, Marques J, Riccetto C. Abdominopelvic kinesiotherapy for pelvic floor muscle training: A tested proposal in different groups. Neurourol Urodyn. 2014; 33: 1003.

4. Fast A, Ducommun DJ, Medina E, Butler JG. Low-back pain in pregnancy: Abdominal muscles, sit-up performance and back pain. Spine. 1990; 15: 28-30.

5. Mason L, Roe B, Wong H, Davies J, Bamber J. The role of antenatal pelvic floor muscle exercises in prevention of postpartum stress incontinence: A randomised controlled trial. J Clin Nurs. 2010; 19: 2777-2786.

6. Wang X, Li G, Deng M. Pelvic floor muscle training as a persistent nursing intervention: Effect on delivery outcome and pelvic floor myodynamia. Int J Nurs Stud. 2014; 1: 48-52.

7. Satyapriya M, Nagendra HR, Nagarathna R, Padmalatha V. Effect of integrated yoga on stress and heart rate variability in pregnant women. Int J Obstet Gynaecol. 2009; 104: 218-222.

8. Barakat R, Cordero Y, Coteron J, Luaces M, Montejo R. Exercise during pregnancy improves maternal glucose screen at 24-28 weeks: a randomised controlled trial. *BJSM*, *46*(9), 656-661.

### **Duplicates**

1. Price BB, Amini SB, Kappeler K. Exercise in pregnancy: Effect on fitness and obstetric outcomes: A randomized trial. Med Sci Sports Exerc. 2012; 44: 2263-2269.

Author	Country	Type of Study	Sample size, n	Age, years (SD)	Gestational Age at study entry, weeks (SD)	Weight at study entry, kg (SD)	Pre- pregnancy BMI, kg/m <sup>2</sup> (calculated from paper)	Pre-intervention activity/fitness level
Barakat et al. (1)	Spain	RCT	I: n=382 C: n=383	I: 31.6 (4.2) C: 31.8 (4.5)	All: 9 - 11	N/R	N/R	I: 16% (n=61) Active, 84% (n=321) Inactive C: 81.7% (n=313) Inactive, 18.3% (n=70) Active
Price et al.(2)	USA	RCT	I: n=31 C: n=31	I: 30.5 (5) C: 27.6 (7.3)	All: 12 – 14	N/R	N/R	All: Inactive before intervention.
Stafne et al.(3)	Norway	RCT	I: n=429 C: n=426	I: 30.5 (4.4) C: 30.4 (4.3)	All: 18 - 22	I: 70.4 (9.8) C: 70.8 (10.3)	N/R	In the intervention group, 228 exercised regularly and 60 exercised 3 times per week at moderate to high intensity
Avery et al.(4)	Canada	OBS	All: n=12 Participants were randomly assigned to the type of supine exercise and order of exercises performed (n=2	29 (1)	31	N/R	N/R	All: Not active before pregnancy. During pregnancy: Women did not participate in any strength training programs.

# Online Supplement Table 1. Study characteristics of all reported studies.

			per possible combination: SL+DL, DL+SL)					
Green et al.(5)	Australia	OBS	All: n=26	N/R	36-40	N/R	N/R	During pregnancy: Had been attending a series of routine hospital antenatal exercise classes including supine exercise for 4 to 8 visits and were deemed medically fit by health care provider
Jeffreys et al.(6)	USA	OBS	All: n=14	34 (3)	31 (2) Eight women were measured again at 36 (1) weeks	N/R	20.7	During pregnancy: Physically active - had continued regular supine floor-based exercise beyond the 28 <sup>th</sup> week; floor-based exercise 2 to 6 times per week; participated (3 to 6 times per week) in 30+ min of aerobics, running, kick boxing, yoga, or weight training at moderate to high intensity (rating of perceived exertion 13 to 17 on a 6-20 point scale)
Nesler et al.(7)	USA	OBS	Group 1: n=12 Group 2: n=13	Group 1: 30 (4) Group 2: 31 (4)	Group 1: 26.7 (1.8) Group 2: 35 (1.6)	N/R	Group 1: 22.8 Group 2: 21.3	During pregnancy: Healthy women enrolled in an ongoing pregnancy fitness program (YMCA prenatal exercise classes)

Note: BMI: body mass index; C control; DL: Double leg extension; I intervention; N/R: not reported; OBS: observational study; RCT: randomized controlled trial; (SD): standard deviation; SL: Single leg extension

Group 1 refers to 12 women measured at 24 to 28 weeks of pregnancy; Group 2 refers to 13 women measured at 32 to 36 weeks of pregnancy.

<b>Online Supplement –</b>	- Table 2. Protocol description of randomized controlled trials that incorporated supine exercise in a s	tructured exercise
class.		

Author	Duration of intervention	Control group		Supine E	xercise Protocol		Full Exercise Protocol			
	(weeks)	description	Frequency	Intensity	Time	Туре	Frequency	Intensity	Time	Туре
Barakat et al.(1)	27-30	Usual Care	3/week	12-14 on Borg's Scale, <70% Max HR	2 minutes/ session	Leg raises, hamstring stretch, bridge pose, kegel exercise	3/week	12-14 on Borg's Scale, <70% Max HR	50-55 minutes per session	Various aerobic exercise, aerobic dance, muscular strength, and flexibility
Price et al. (2)	22-24	Usual Care	1/week	12-14 on Borg's scale	3-5 minutes/session	Supine bridges on 55cm exercise balls; 20 oblique crunches, 20 dumbbell bench press; all supine exercise performed with back supported on a physio ball	3/week	12-14 on Borg's Scale	45-60 minutes per session	Step aerobics on the 1st day, walked as a group over adjacent hilly terrain on the 2nd day, and performed circuit training on the 3rd day. The circuit consisted of 1–10 min of aerobic exercise alternating with an equal time interval of weight training, generally with weight machines, using a weight that allowed one set of 20 reps.
Stafne et al.(3)	12	Usual care.	2-4/week	Moderate to high, 13- 14 on Borg's Scale	N/R	8-10 repetitions of various abdominal strengthening exercises. Participants were given the option to	2-4/week	Moderate to high, 13- 14 on Borg's Scale	60 minutes/ session	Fitness class included aerobic exercise (30-35 minutes), muscle strengthening (20-25 minutes) and stretching (5- 10 minutes).

			switch to a		(Diet Co-
			seated		Intervention)
			position if		Additionally, all
			they felt		participants
			discomfort.		received written
					recommendations
					for diet, pelvic
					floor muscle
					exercises and
					lumbo-pelvic
					pain due to
					pregnancy.

Note: HR: heart rate; N/R: Not reported.

Author	Baseline	<b>Baseline</b> protocol	Exercise protocol				Post-exercise
	position, duration (minutes)		Intensity	Time (minutes)	Description	exercise position, duration (minutes)	protocol
Green et al.(5)	Lateral, 10	Resting FHR tracing obtained throughout 10 minutes	N/R	35-40	*Eight exercises in supine position were performed: A) With the hips and knees flexed, the pelvis was tilted moving the pubic symphysis towards the chest. The pubic symphysis was held in this position for 5 seconds then relaxed. This was repeated 10 times. B) Thighs were abducted and the knees flexed while keeping the feet together. C) Knees were kept together and flexed, twisting them to one side. D) Buttocks were pressed against the wall with the extended legs abducted on the wall. E) With the buttocks still against the wall, the feet were kept together on the wall and the knees flexed and abducted. F) Squatting position was adopted against the wall. G) Patient 'sat' on her feet with knees flexed. H) Knees were bent up together and taking 5 long slow breaths. The static exercises were maintained for five minutes with the exception of "F", which most patients managed for only 3-4 minutes.	Lateral, 10	Resting FHR tracing obtained throughout 10 minutes.
Nesler et al.(7)	Left- Lateral, 20	Unclear when baseline measures FHR tracings were taken.	N/R	5	Abdominal strengthening exercises including pelvic tilts, pelvic tilt with curl, leg sliding, and flexion and extension of the foot. Unclear how outcomes were assessed.	Left-lateral, 20 minutes after the supine exercise for unknown duration	Unclear when post- exercise measures of FHR tracings were taken
Jeffreys et al.(6)	TP1: Left- lateral, 5 TP2: Supine, 3	Maternal BP and HR measurements were begun and repeated at 2-minute intervals. FHR recorded before supine position. In supine maternal BP and HR were begun and repeated at 2-minute intervals. After 5	15 [Borg's 6- 20 scale] Range: 13 to 17 (moderate to very hard)	10	The exercise sequence included 60- to 90-second intervals of abdominal crunches (flexion of the head, neck, and upper thorax on the trunk) alternating with 60–90 seconds of either leg lifts (flexion of extended legs on the trunk) or cycling motions (alternating thigh flexion and extension on the trunk) at a cadence of 60 moves per minute. Maternal blood pressure and heart rate measurements were begun at 3 minutes and repeated during each set of leg exercises and at	Left-lateral, 2	Left-lateral rest position, and a final set of measurements was obtained after 2 minutes of recovery in that position.

Online Supplement – Table 3. Protocol description of the observational studies that included acute exercise in the supine position.

r	1						
		minutes, duplicate			completion of the exercise. Duplicate volume		
		estimates of volume			flow estimates in the ascending branch of the		
		flow through the			right uterine artery were obtained at the same		
		ascending branch of the			point in the vessel during a 10- to 20-second		
		uterine artery were			pause in the exercise at 5 minutes and again		
		obtained at the same			within 10–20 seconds of exercise cessation at 10		
		point in the vessel as			minutes. Then a brief measurement of fetal heart		
		those obtained at left-			rate was obtained.		
		lateral rest.					
Avery et	N/R	Supine rest (30° up	N/R	N/R	3 sets of 10 reps of sub-maximal single leg	N/R	N/R
al.(4)		from supine) and rest in			extension and double leg extensions; performed		
		a seated position.			at 30 degrees incline and in a seated position.		
		1			Participants were randomized to the type and		
					combination of exercises with 2 participants		
					performing each possible combination in a		
					supine and seated position.		

Note: \*As recommended by Balaskas and Balaskas (28); TP – time point; BP – blood pressure; HR – heart rate; FHR – fetal heart rate; N/A Not applicable; N/R – not reported. Avery et al. (4) was included as an observational study as participants were randomized to the type and combination of exercise but not to a specific group.

# Online Supplement Table 4: The association between prenatal supine exercise (acute) and maternal outcomes.

			Quality ass	sessment	ent № of participants Effect				№ of participants Effect			
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	supine exercise	left- lateral rest	Relative (95% CI)	Absolute (95% CI)	Quality	Importance
Evidence	from cohort studi	ies: Associ	ation between supi	ne exercise and n	naternal diastolic	and systolic blood j	pressure measu	ired from b	efore to duri	ng exercise.		
2	observational studies anot seriousnot seriousnot seriousnot seriousnoneNarrative synthesis: Two studies were included (n=16).1/2 reported a significant increase in both systolic (19%) and diastolic (30%) blood pressure during supine exercise compared to left-lateral rest (6).1/2 reported a significant increase in both systolic (19%) and diastolic (30%) blood pressure during supine exercise compared to left-lateral rest (6).1/2 reported no significant difference in systolic or diastolic blood pressure for two women as they moved from 30 degree incline rest to supine exercise (4).							⊕⊕⊖⊖ LOW	CRITICAL			
Evidence	from cohort studi	ies: Associ	ation between supi	ne exercise and n	naternal mean blo	ood pressure measur	red from before	e to during	exercise.			
2	observational studies <sup>a</sup>	not serious	not serious	not serious	not serious	none	Narrative syn (n=41). <b>2/2 studies</b> r and 26%, res pressure duri left-lateral re	nthesis: Tw eported a sispectively) ing supine est (6, 7).	o studies we gnificant ind in mean mate exercise com	re included crease (22% ernal blood pared to		CRITICAL
Evidence	from cohort studi	ies: Associ	ation between supi	ne exercise and n	naternal heart rate	e measured from be	fore to during	exercise.				
3	observational studies <sup>a</sup>	not serious	not serious	not serious	not serious	none	Narrative syn included (n= 2/3 studies r and 29%, res when changi exercise (6, ' 1/3 studies f rate (4).	nthesis: Thr 43). eported a sispectively) ng from lef 7). ound no ch	ee studies w gnificant ind in maternal h t-lateral rest ange in mate	ere crease (13% heart rate to supine crnal heart	⊕⊕⊖⊖ LOW	CRITICAL

# **CI:** Confidence interval; **OR:** Odds ratio

# Explanations

a. Cohort study

Online Supplement Table 5: The association between prenatal exercise that included supine exercise and small birth weight.

			Quality ass	essment			№ of par	ticipants	nts Effect			
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Prenatal exercise that included supine exercise	no exercise	Relative (95% CI)	Absolute (95% CI)	Quality	Importance
Associatio	on between a struc	ctured exer	cise class intervent	ion that included	supine exercise a	nd small birth weigl	ht (<2500 g)	•				
1	randomized trialsserious aserious bnot seriousnot serious cnoneNarrative summary: Barakat et al. (2016) (1) reported no association between prenatal exercise (Intervention, n=382; Control, n=383) that included supine exercise and no exercise.ation between a structured exercise class (exercise-only interventions and exercise + co-interventions) that included supine exercise and small for gestational							CRITICAL				
Associatio	on between a struc	ctured exer	cise class (exercise	-only intervention	ns and exercise +	co-interventions) th	Narrative synthesis: Two studies were in			for gestation	al age <10th	percentile.
2	randomized trials	serious <sup>d</sup>	not serious	serious <sup>e</sup>	serious <sup>f</sup>	none	Narrative synthesis: Two studies were include (Intervention, n=460; Control, n=457). <b>2/2 studies</b> found no association between prenatal exercise that included supine exercise and no exercise (2, 3).				⊕○○○ VERY LOW	CRITICAL
Sensitivity	y analysis: Associ	ation betwo	een a structured exe	ercise class (exerc	cise-only interver	tions) that included	supine exerc	vise and sma	all for gestation	onal age <10t	h percentile.	
1	randomized trials	serious <sup>g</sup>	serious <sup>b</sup>	not serious	not serious <sup>c</sup>	none	Narrative s (Intervention association included su	ummary: Pr on, n=31; Co between pr pine exercis	ice et al. (20) ontrol, n=31) enatal exercises and no exe	2) (2) reported no se that rcise.	⊕⊕⊖⊖ LOW	CRITICAL
Sensitivit	y analysis: Associ	ation betwo	een a structured exe	ercise class (exerc	cise + co-interver	tions) that included	supine exerc	vise and sma	ll for gestation	onal age <10t	h percentile.	
1	randomized trials	serious <sup>h</sup>	serious <sup>b</sup>	serious <sup>i</sup>	not serious <sup>c</sup>	none	Narrative summary: Stafne et al. (2012) (3) (Intervention, n=429; Control, n=426) reporte no association between prenatal exercise that included supine exercise and no exercise.			012) (3) 6) reported rcise that rcise.	⊕○○○ VERY LOW	CRITICAL
Evidence	from cohort studi	es: Associa	tion between struc	tured exercise cla	sses that included	l supine exercise an	e and small for gestational age (<10th percentile).					
1	observational studies <sup>j</sup>	not serious	serious <sup>b</sup>	not serious	not serious <sup>c</sup>	none	Narrative s reported on age (<10th engaged in structured of	ummary: Ga e incident o percentile) supine exer exercise class	reen et al. (19 of small for geout of 26 wor cise as part of ss (5).	88) estational nen who f a		CRITICAL

#### CI: Confidence interval; OR: Odds ratio

#### **Explanations**

a. Serious risk of bias. High risk of performance bias (compliance to the supine exercise portion of the intervention classes was not reported). Unclear risk of selection bias; it was unclear if allocation was adequately concealed.

b. Serious inconsistency. Only one study was included.

c. No serious imprecision; only one study but already downgraded for serious inconsistency for this reason.

d. Serious risk of bias. Unclear detection bias (potentially flawed measurement of the outcome). High risk of performance bias (potentially flawed blinding methods and outcomes may be influenced by this; compliance to the supine exercise portion of the intervention classes were not reported or women were allowed to not complete the supine exercise portion if they chose), and attrition bias. Unclear risk of selection bias; it is unknown if allocation concealment was adequate.

e. Serious indirectness. Exercise-only interventions and exercise+co-interventions were combined for analysis.

f. Serious imprecision. The 95% CI crossed the line of no effect, and was wide, such that the interpretation of the data would be different if the true effect were at one end of the CI or the other.

g. Serious risk of bias. High risk of performance bias (compliance to the supine exercise portion of the intervention classes was not reported) and unclear detection bias (potentially flawed measurement of the outcome).

h. Serious risk of bias. High risk of performance bias (potentially flawed blinding methods and outcomes may be influenced by this; or women were allowed to not complete the supine exercise portion if they chose), and attrition bias. Unclear risk of selection bias; it is unknown if allocation concealment was adequate.

i. Serious indirectness. Exercise was combined with a co-intervention.

j. Cohort study

			Quality as	sessment			№ of participants Effect		fect				
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Prenatal exercise that included supine exerciseRelative (95% CI)Absol (95%exercise and intrauterine growth restriction.			Quality	Importance		
Evidenc	lence from cohort studies: Association between structured exercise classes that included supine exercise and intrauterine growth restriction.												
1	observational studies <sup>c</sup>	not serious	serious <sup>a</sup>	not serious	not serious <sup>b</sup>	none	Narrative summary: Nesler et al. (1988) reported that out of 25 women that engaged in prenatal exercise classes that included supine exercise, one woman gave birth to an intrauterine growth restricted baby (7).       ⊕○○○ CRITICAL VERY LOW						

Online Supplement Table 6: The association between prenatal exercise that included supine exercise and intrauterine growth restriction.

**CI:** Confidence interval; **OR:** Odds ratio

## Explanations

a. Serious inconsistency. Only one study was included.

b. No serious imprecision; only one study but already downgraded for serious inconsistency for this reason

c. Cohort study

Online Supplement Table 7: The association between prenatal exercise that included supine exercise and perinatal mortality.

			Quality as	sessment			№ of participants Effect				
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Prenatal exercise that included supine exercise	Relative (95% CI)	Absolute (95% CI)	Quality	Importance
Evidenc	Evidence from cohort studies: Association between acute supine exercise and stillbirth.										
1	observational studies <sup>a</sup>	not serious	serious <sup>b</sup>	not serious	not serious <sup>c</sup>	none	Narrative summary: Greet that out of 26 women who exercise classes that inclu- delivered babies who were	⊕○○○ VERY LOW	CRITICAL		

# **CI:** Confidence interval; **OR**: Odds ratio

# Explanations

- a. Cohort study.
- b. Serious inconsistency. Only one study was included.
- c. No serious imprecision; only one study but already downgraded for serious inconsistency for this reason.

Online Supplement Table 8: Association between prenatal supine exercise (acute) and uterine blood flow.

			Quality as	sessment			№ of participants		Effect				
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	supine exercise	left- lateral rest	Relative (95% CI)	Absolute (95% CI)	Quality	Importance	
Evidenc	idence from cohort studies: Association between supine exercise and uterine blood flow measured from before to during exercise.												
1	observational studies <sup>a</sup>	not serious	serious <sup>b</sup>	not serious	not serious <sup>c</sup>	none	Narrative summary: There was an average decrease of 16±23% in uterine blood flow during supine exercise compared to left-lateral rest in 14 women in second trimester (Jeffreys et al. 2006)       ⊕○○○ VERY LOW       CRITICA						

## **CI:** Confidence interval; **OR:** Odds ratio

### **Explanations**

- a. Cohort study
- a. Serious inconsistency. Only one study was included.
- b. No serious imprecision; only one study but already downgraded for serious inconsistency for this reason

# Online Supplement Table 9: Association between prenatal supine exercise (acute) and fetal heart rate.

Quality assessment							№ of participants		Effect			
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	supine exercise	left- lateral rest	Relative (95% CI)	Absolute (95% CI)	Quality	Importance
Evidence from cohort studies: Association between supine exercise and fetal heart rate measured from before to during exercise.												
3	observational studies <sup>a</sup>	not serious	not serious	not serious	not serious	none	Narrative syr (n=53). <b>1/3 studies</b> s mean fetal he compared to <b>2/3 studies</b> r measured at s 5, 7).	nthesis: Three howed a sigr eart rate durin left-lateral ra eported no st rest compare	⊕⊕⊖⊖ LOW	CRITICAL		
Evidence from cohort studies: Association between supine exercise and fetal bradycardia measured from before to during and after exercise.												
3	observational studies <sup>a</sup>	not serious	not serious	not serious	not serious	none	Narrative synthesis: Three studies were included (n=57). <b>3/3 studies</b> reported one woman who showed fetal bradycardia at rest (4, 5, 7) <b>1/3 studies</b> did not let the woman continue in the study so no assessment occurred during supine exercise (7). <b>1/3 studies</b> reported two women who showed fetal bradycardia during supine exercise and 3 women who showed fetal bradycardia post supine exercise (4).				⊕⊕⊖⊖ LOW	CRITICAL
Evidence from cohort studies: Association between supine exercise and abnormal fetal heart rate tracings (as reported by author) measured from before to during exercise.												

Quality assessment							№ of participants		Effect			
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	supine exercise	left- lateral rest	Relative (95% CI)	Absolute (95% CI)	Quality	Importance
3	observational studies <sup>a</sup>	not serious	not serious	not serious	not serious	none	Narrative synthesis: Three studies were included (n=65). 1/3 studies reported 12 (46%) out of 26 women had abnormal fetal heart rate tracings; 4 abnormal tracings occurred at rest; 3 out of 4 abnormal tracings continued during supine exercise; 8 abnormal tracings were found in those women who had normal tracings at rest when they engaged in supine exercise (5). 1/3 studies reported 5 (19%) out of 27 had abnormal FHR tracings and 2 of these women were dropped and not allowed to continue the supine exercise protocol; the 3 other women continued to have abnormal tracings during supine exercise (7). 1/3 studies reported 4 (33%) fetal events from 12 women during various types of supine exercise (4).			⊕⊕⊖⊖ LOW	CRITICAL	

# CI: Confidence interval; OR: Odds ratio

# Explanations

a. Cohort study

### **Included Studies:**

1. Barakat R, Pelaez M, Cordero Y, Perales M, Lopez C, Coteron J, et al. Exercise during pregnancy protects against hypertension and macrosomia: randomized clinical trial. AJOG. 2016; 214:649.e1-8.

2. Price BB, Amini Sb Fau - Kappeler K, Kappeler K. Exercise in pregnancy: effect on fitness and obstetric outcomes-a randomized trial. Med Sci Sports Exerc. 2012;44:2263-9.

3. Stafne SN, Salvesen Ka Fau - Romundstad PR, Romundstad Pr Fau - Eggebo TM, Eggebo Tm Fau - Carlsen SM, Carlsen Sm Fau - Morkved S, Morkved S. Regular exercise during pregnancy to prevent gestational diabetes: a randomized controlled trial. Obstet Gynecol. 2012;119:26-36.

4. Avery ND, Stocking Kd Fau - Tranmer JE, Tranmer Je Fau - Davies GA, Davies Ga Fau - Wolfe LA, Wolfe LA. Fetal responses to maternal strength conditioning exercises in late gestation. Can J Appl Physiol. 1999;24:362-376.

5. Green Rc Fau - Schneider K, Schneider K Fau - MacLennan AH, Mac LA. The fetal heart response to static antenatal exercises in the supine position. Aust J Physiother. 1988;34:3-7.

6. Jeffreys RM, Stepanchak W Fau - Lopez B, Lopez B Fau - Hardis J, Hardis J Fau - Clapp JF, 3rd, Clapp JF, 3rd. Uterine blood flow during supine rest and exercise after 28 weeks of gestation. BJOG. 2006;113:1239-47.

7. Nesler CL, Hassett Sl Fau - Cary S, Cary S Fau - Brooke J, Brooke J. Effects of supine exercise on fetal heart rate in the second and third trimesters. Am J Perinatol. 1988;5:159-63.