

Musculoskeletal challenges during pregnancy and postpartum

Kari Bø

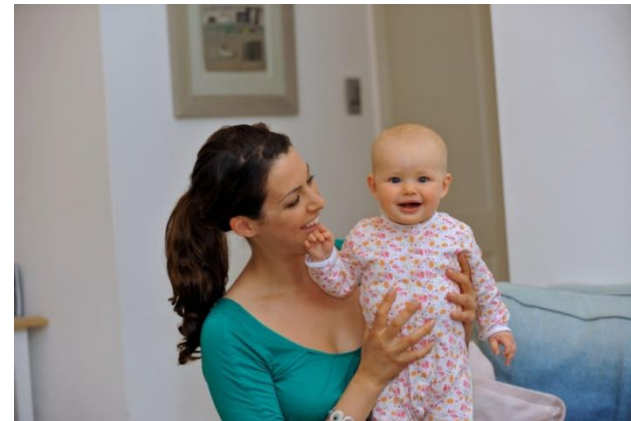
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Akershus University Hospital, Department of Obstetrics and Gynecology

Pregnancy and childbirth

- Happiness and joy!
- Window of opportunity!
- Most women in developed countries meet health personell regularly during pregnancy and during the years following childbirth
 - Health promotion?
 - Disease prevention?
- Most women are motivated for change in lifestyle
 - Stop smoking
 - Improve nutrition
 - Exercise?
 - Harming the fetus?
 - Difficult birth?
 - Dangerous to pelvic outlet, pelvic floor and abdominals?



Recommendations WHO, ACOG, RCOG, Aust/NZ Obstet Gyn 2020-2022

Physical activity for pregnant women

Helps to control weight gain | Helps reduce high blood pressure problems | Helps to prevent diabetes of pregnancy

Improves fitness | Improves sleep | Improves mood

Not active?
Start gradually

Already active?
Keep going

Home

Out and about

Leisure

Throughout pregnancy aim for at least **150 minutes** of moderate intensity activity every week

Do muscle strengthening activities twice a week

Every activity counts, in bouts of at least 10 minutes

No evidence of harm | Listen to your body and adapt | Don't bump the bump

UK Chief Medical Officers Recommendations 2017: Physical Activity in Pregnancy. bit.ly/startactiveinfo



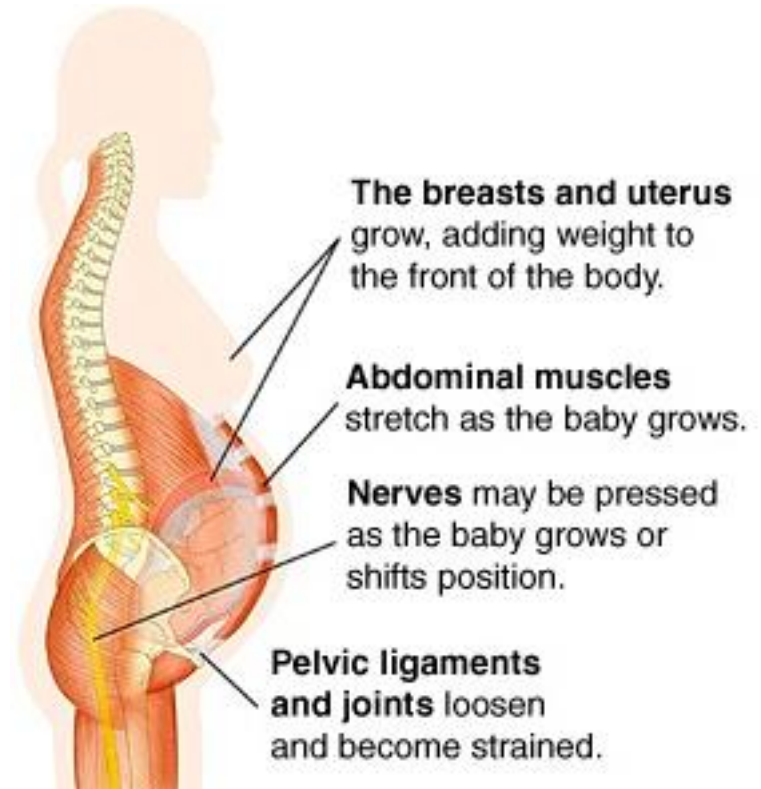
Risk period for female illnesses and complaints

- Fatigue/ nausea /Constipation
- Depression /anxiety
- Weight gain
- Gestational diabetes (10%) Kim-10
 - 2/3 normalised after birth, develop type 2 diabetes within 5 years of delivery
 - Increased risk of babies born > 4 kg and for obesity and diabetes later in life for child
- Hypertension (6%)
 - ▲ risk of cardiovascular disease
- Pre-eclampsia (2-7%) Stocks-14
 - Risk factors: diabetes and obesity
- **Musculoskeletal complaints**
 - Low back
 - Pelvic girdle
 - Pelvic floor
 - Abdomen /Diastasis recti abdominis



Musculoskeletal changes

- Posture
 - Increased lumbal lordosis and thoracal kyphosis?
- Laxity/ flexibility; ↑ injuries?
- Balance?
 - 50% of injuries in pregnancy due to falls Dunning et al-03
 - 27% fall rate same as ≥ 65 year olds Dunning-10, Swift-01
 - Pregnant women 2-3 times more likely to be injured by falling than non-pregnant Cakmak et al-16, Vladutiu-10



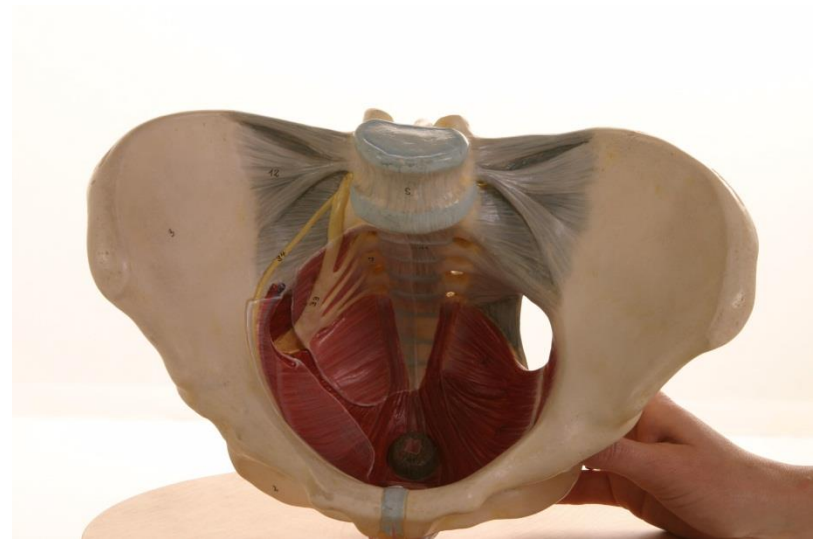
Low back pain in pregnancy

- Affects 2/3 of pregnant women Liddle & Pennick, Cochrane -15
- 25% continue to experience LBP or PGP 1 year after delivery Davenport et al 2018



Pelvic girdle pain (PGP)

- Pain experienced between the posterior iliac crest and the gluteal fold, particularly in the vicinity of the sacroiliac joints
Vleeming et al -08
- Prevalence: about 50% during pregnancy Wu et al. 2004
- An estimated 20-25% of all pregnant women suffer from PGP sufficiently serious to require medical help (Vleeming et al. 2008;Wu et al. 2004)
- Elite athletes: PGP: 29.6% during pregnancy, LBP:18.5%
Bø & Bakke-Hansen -07



Exercise for the prevention and treatment of low back, pelvic girdle and lumbopelvic pain during pregnancy: a systematic review and meta-analysis Davenport et al-18

- 13 RCTs: Very low to moderate quality evidence: Exercise initiated during pregnancy does NOT reduce odds of suffering from BP, PGP, LBPP, neither during pregnancy nor postpartum
- 15 RCTs very low to moderate quality evidence: exercise during pregnancy **lower pain severity in pregnancy and early post-partum**
- Exercise components of the interventions: yoga, aerobic exercise, general muscle strengthening or muscle strengthening specific to one body region and the combination of aerobic and resistance training



Waterobics for low back pain in pregnancy Kihlstrand et al-99

- 244 pregnant women with low back pain in gestational week 19
- R:
 - Wateraerobics 17-20 times 30 min
 - Control 17-20 times of 30 min relaxation
- Results: reduction in pain and sickleave in watergymnastic group after gestational week 32-33



Can general CORE stability training prevent and treat low back pain?



Stabilisation exercises for LBP: a systematic review and meta-analysis

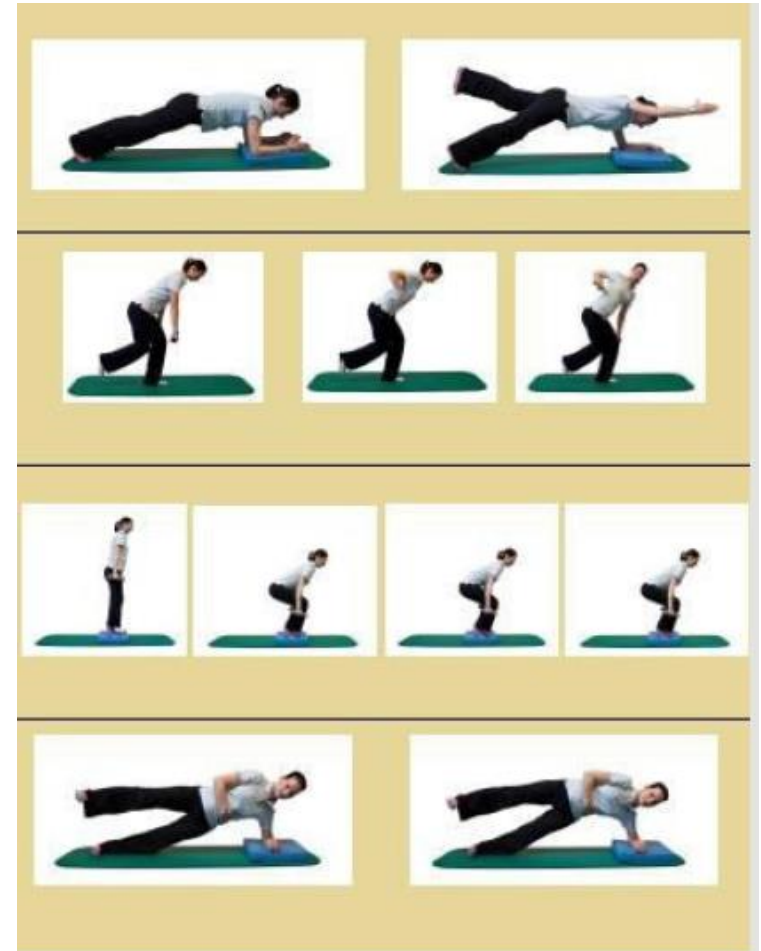
Smith et al, BMC Musculoskel Disorders - 14

- Stabilisation or «core stability» exercises are POPULAR but LACK EVIDENCE
- 29 RCTs; 22 (n=2.258) on pain and 24 (n= 2.359) on disability
- **Clinically insignificant** differences between groups
- Conclusion: Strong evidence: **stabilisation exercise are NOT more effective than any other form of exercise in the long term**
- Low levels of heterogeneity and large number of high quality studies
- **Further studies unlikely to considerably alter this conclusion**



Motor Control Exercise for Nonspecific Low Back Pain: A Cochrane Review Saragiotto et al-16

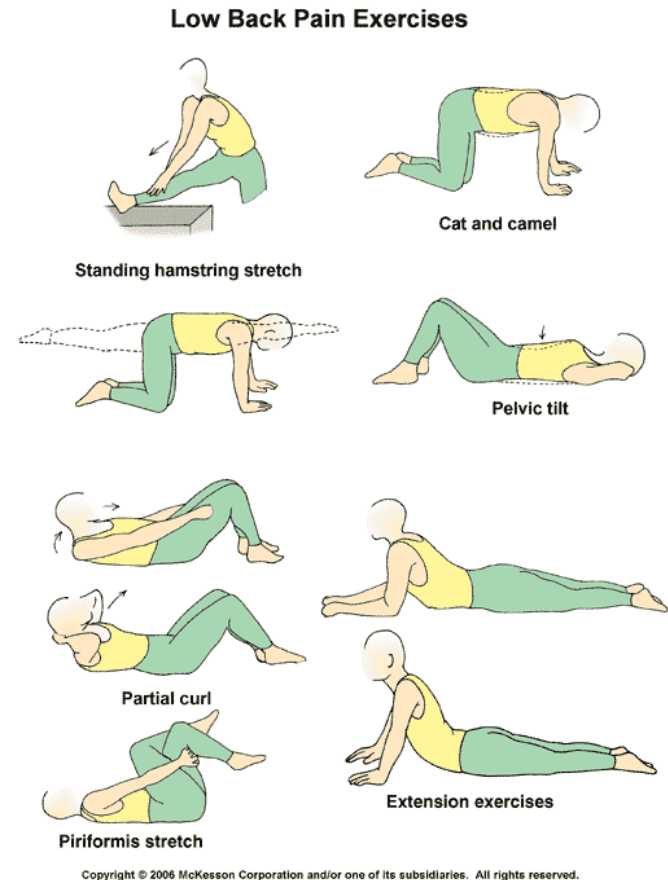
- 32 trials (n = 2628), low risk of bias
- Conclusion:
 - Motor control exercise is probably more effective than a minimal intervention for reducing pain, but probably does not have an important effect on disability, in patients with chronic LBP
 - There was **no clinically important difference between motor control exercise and other forms of exercises or manual therapy for acute and chronic LBP**



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Prevention and treatment of low back pain: evidence, challenges, and promising directions Foster et al The Lancet-18

- For persistent low back pain (>12 weeks duration), include a graded activity or exercise programme that targets improvements in function and prevention of worsening disability
- Since evidence showing that one form of exercise is better than another **IS NOT AVAILABLE**, guidelines recommend exercise programmes that take individual needs, preferences, and capabilities into account in deciding about the type of exercise



Postpartum LBP and PGP

- Spontaneous recovery
- General pregnant population
 - 22% PGP 6 months pp, only
3% severe Bjelland et al-13
- Elite athletes Bø & Bakke-Hansen-07
 - 6 weeks pp: 12.6% PGP; 9.7% LBP
 - 0-17 years pp: 19.4% PGP; 29% LBP
 - No diff athletes/controls
- Treatment: 7 RCTs', one high quality RCT shows good effect Stuge et al -04
 - No studies of athletes



Interventions

SSEG

CG

Information / coping strategies
Body awareness / ergonomics

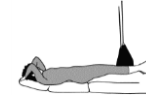
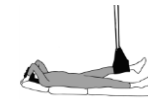
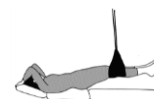
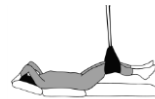
Ordinary physical activity

Mobilization / self mobilization
Massage / relaxation
Stretching

Strengthening exercises

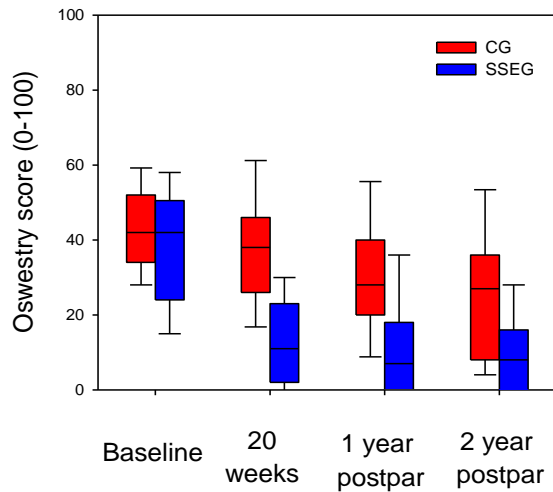


Specific stabilizing exercises



■ **The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy**
A Randomized Controlled Trial

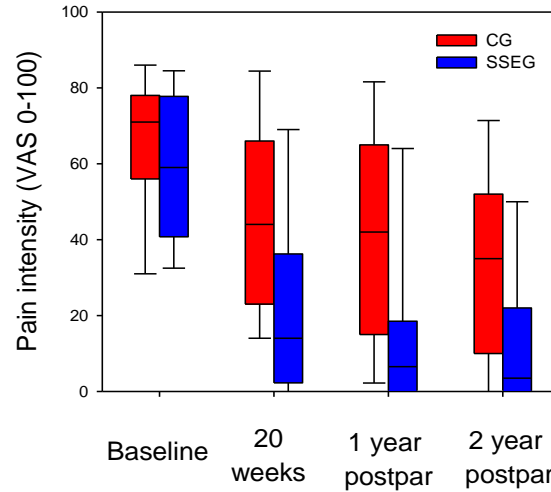
Britt Stuge, MSc, PT*, Even Lærum, PhD, Gitte Kirkesola, PT†, and Nina Vællestad, PhD*



p=0.15 p<0.001 p<0.001 p<0.001

■ **The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy**
A Two-Year Follow-up of a Randomized Clinical Trial

Britt Stuge, MSc, PT,* Marit Bragelien Veiered, PhD,† Even Lærum, PhD,† and Nina Vællestad, PhD*



p=0.19 p<0.001 p<0.001 p<0.001

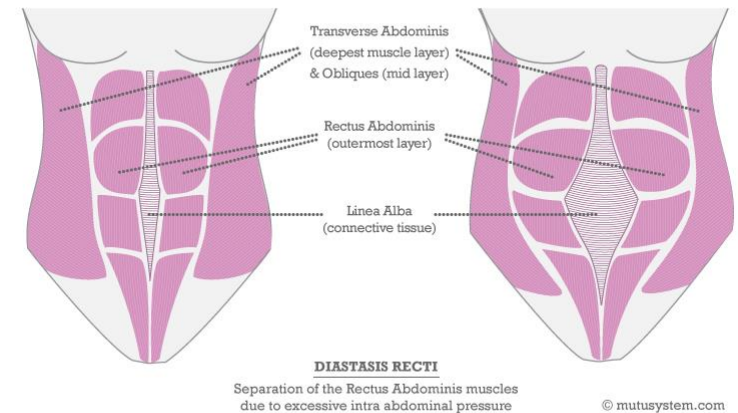
Diastasis recti abdominis

- An impairment with midline separation of the two rectus abdominis muscles along the linea alba

Venes & Taber 2013

- Prevalence: 27-100% during pregnancy

Boissonault & Blaschak-88, Mota et al-15



The abdominal wall

- "In many women the abdominal walls very slowly and imperfectly regain their previous elasticity. In, but a few, the tonus is well preserved" DeLee 1918



Rectus diastase fra Forskning.no



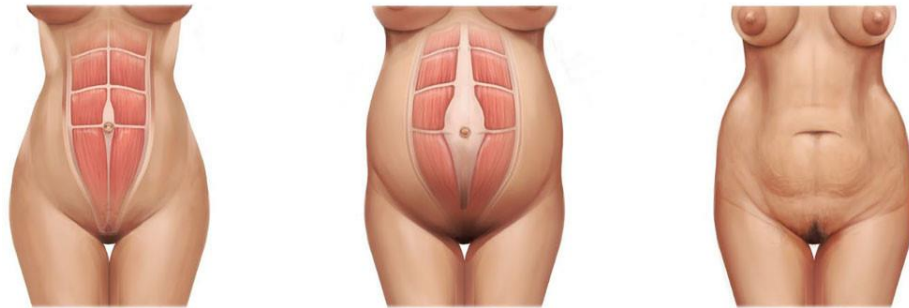
Measurement methods



- Palpation; fingerwidth
- Calipers
- Ultrasound Mota et al -12
 - Intra-rater ICC > 0.9
 - Inter-rater ICC = 0.7-0.9



Longitudinal study GW 21-12 months pp Sperstad et al-15



- Prevalence Sperstad et al 2015:
 - GW 21: 33.1%
 - 6 wk pp: 60.0%
 - 6 mo pp: 45.7%
 - 12 mo pp: 32.6%

Prevalence of diastasis recti in a urogynecological patient population^{Spiznagle et al -07}

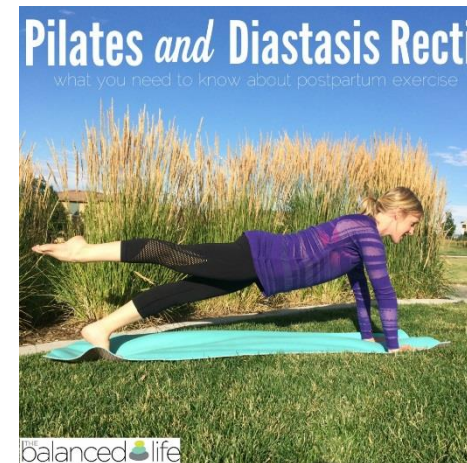
- 541 patients seeking help for PFD (myofascial pelvic pain, UI, FI, POP), mean age 52.5 years (SD 16.6)
- Evaluated with finger width
- Results
- Prevalence 52%
- 35% of nulliparous
- DRA women were older, reported higher parity, had weaker PFM, Caucasian/African, menopausal, using hormonal replacement therapy, abdominal surgery
- Association DRA/PFD ^{Harada et al-20}
- No association found in other studies ^{Bø et al-16, Wang et al-19, Gluppe et al-20}
- Change in connective tissue problem?

Is this a diastasis? Does it cause any problems?



Prevention and treatment of DRA during pregnancy?

- No RCTs in the general pregnant population or in athletes
- One retrospective study Chiarello et al-05
- Can stretched abdominals be trained?
 - At GW 36 length of abdominal muscles ↑ with mean 115%. Change in angle of insertion, reducing ability to generate torque Gilleard & Brown -96
- Which exercises?
- Ongoing PhD project: Nina MT Theodorsen, UiB



Abdominal strength post partum

- N=40, postpartum women weaker abdominals than matched controls, no correlation with IRD (ultrasound) at 6 months Liaw et al-11
- N=57 (2 men), mean age 39.8 (25-60) undergoing surgery for DRA. Intra-operative measurement: correlation width of IRD and weak abdominals (Biodex) below umbilicus, not above Gunnarson et al -15
- N=40, women with minor diastasis 1 year PP: ↓ trunk rotation torque & sit up test, larger IRD associated with worse performance Hills et al-18
- No difference in strength Gluppe et al-20



Low back – or pelvic girdle pain postpartum?

- Women with DRA had more abdominal and pelvic pain, but no LBP, than women without DRA Parker et al-09
- No diff at 6 months pp Mota -15
- No diff at 12 months pp Sperstad et al -15
- No diff between women with BP or PGP in IRD Chiarello-17
- No corr IRD and LBP/Pelvic pain 3 weeks pp. Sign corr abdominal pain & body image Keshwani et al-17
- **69% of 16 with DRA had LBP vs 47% in 93 without DRA had LBP** Dubkova et al-18
- No sign diff LBP, PGP, abdominal pain 12 months pp Hills et al-18
- No sign association with lumbo-pelvic pain or UI, small association with POP (SR) Benjamin-18
- Higher prevalence of abdominal pain but not LBP/PGP Gluppe et al-20



Consequences of severe diastasis?



Prevention and treatment?

WWW....

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Treatment for Diastasis Recti

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Do You Want to:

- Stay fit during pregnancy?
- Have the healthiest pregnancy possible?
- Learn safe prenatal exercise techniques?
- Avoid excessive weight gain during pregnancy?
- Prevent or repair **diastasis recti** (abdominal separation)?
- Avoid prenatal problems such as back pain?
- Have a stress-free, relaxed pregnancy?
- Have a shorter labor and delivery?
- Bounce back quickly after pregnancy?
- Learn safe **postpartum exercises**?
- Be a fit, healthy role-model mom?
- Have a stronger, healthier, and even smarter baby?

If you answered YES to any of these questions, then you've come to the right place. Here at BeFit-Mom, you'll find a wealth of free, in depth, expert information and advice about prenatal and postpartum fitness and exercise to help you have the healthiest pregnancy, and the healthiest baby.

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Our mission is to educate, motivate, and support prenatal and postnatal women, and to inspire women to lead their entire families to better health and wellness.

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Because healthy moms have healthy babies!

the dailyhiit blog
the home workout movement

hit life hit diet hit workout hit community

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Diastasis Recti: How to PROPERLY train & strengthen your core for FLAT abs!

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- Quadrupleg beams to walk tight, makes it so pre-natal bodybuilding competition
- Just Boudie Thigh Gap
- What it Takes to Lose a Pound of Fat
- 25 Days of Christmas Booty Squat Challenge

Diastasis recti abdominis ACOG 2020

- “ Abdominal strengthening exercises, including abdominal crunch exercises and the drawing-in exercise, a maneuver that increases abdominal pressure by pulling in the abdominal wall muscles, **UNTRUE!** have been shown to decrease the incidence of diastasis recti abdominus and decrease the inter-rectus distance in women who gave birth vaginally or by cesarean birth”



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Norwegian single blind RCT Gluppe et al, Phys Ther -18

- Control: usual care
- 4 month group training once a week
 - Strength training:
 - 5 sets of PFM exercises in different positions
 - 3 sets of abdominal exercises
 - 3 sets of back exercises
 - Strength training of arms and legs
 - Ergonomics: lifting technique
 - Posture, breathing and body awareness
 - Stretching of shoulder and neck
 - Total body relaxation
 - Home PFMT: 3 sets of 8-12 contractions/ day



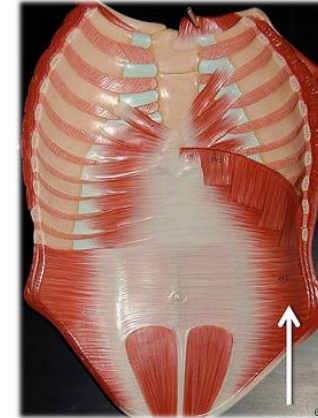
	6 weeks pp	6 months pp	12 months pp	
Training group	48 (55.2%)	38 (43.7%)	36 (41.4%)	p<.01
Control group	48 (54.5%)	39 (44.3%)	35 (39.8%)	p<.01

No statistically significant difference between groups at any time

Pilot RCT on TrA and kinesiotape Tuttle et al-18

- 30 women 6-12 weeks postpartum with 2 finger palpable diastasis
- Randomized to 12 weeks of
 - TrA training n=10 (4-5 x 10 in 4 positions)
 - Kinesiotape n=8
 - TrA + kinesiotape n=5
 - Control n=7
- Primary outcome: IRD assessed with ultrasound
- Secondary outcome: LBP (Roland Morris) & PFD (PDFI-20)
- Results
 - Statistical significant better results of TrA and TrA + kinesiotape compared to kinesiotape alone and control
 - No diff in LBP or PFD

Transversus abdominis



Constricts abdomen and supports abdominal viscera



Early onset training for DRA Bobowik& Dabek-18

- 40 women 0-3 days pp
- Palpation, cut off $\geq 2\text{cm}$
- Randomized to:
 - Control; no exercise
 - Exercise;
 - 20 min prone rest
 - 10 of 3 supine exercises (headlift, crunch, leg lift)
 - Functional training
- Results
 - 19 (95%) vs 3 (15%), $p < 0.001$)
reduced DRA



Straight Leg Raise

"Deep core stability for DRA" Thabet & Alshehri 2019

- 3-6 months pp
- 40 women (22-35 years) R to 8 weeks of 3 times/week 20 reps of each exercise + daily home exercise
 - A. Diaphragmatic breathing, PFM, plank, isometric abd. contr + trad abd. ex
 - B. Trad abd ex
- Results (caliper)
 - A sign better than B at posttest in DRA (20.05 mm(0.69) vs 23.65 mm (1.14), $p=0.0001$) and QoL



Drawing in vs sit up/abdominal crunch?

- "Drawing in" **widens** the IRD Mota et al-12, Sancho et al -15, Mota et al 15, Lee & Hodges – 17, Theodorsen et al-17, Gluppe et al-20
- PFM contraction **widens** the IRD Theodorsen et al-17, Lee & Hodges -17, Gluppe et al-20
- Sit up/curl up **narrows** the IRD Mota et al-12, Sancho et al-15, Pascoal et al-14, Chiarello et al-16, Lee & Hodges-17, Gluppe et al-20, (Saleem et al-21 RCT)



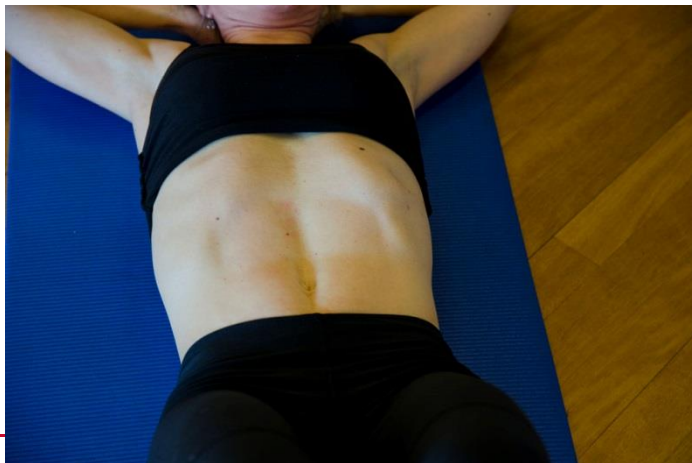
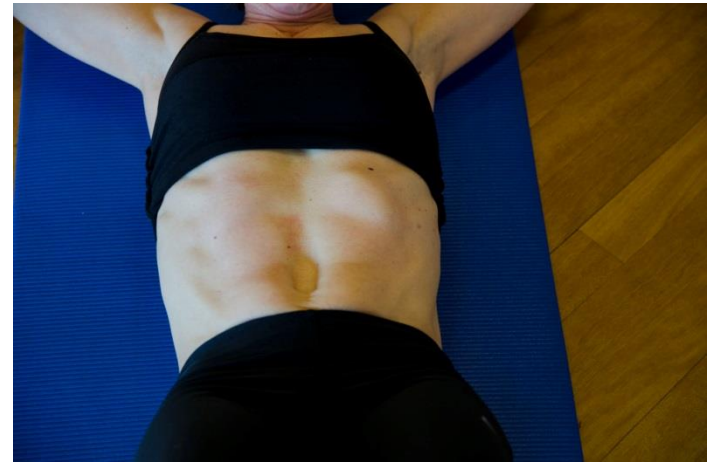
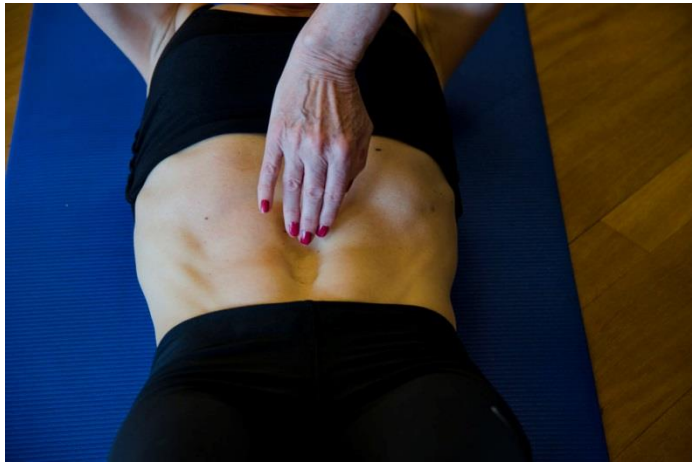
Evidence for PP abdominal training for DRA:

Benjamin et al 2014, **Gluppe et al-21**

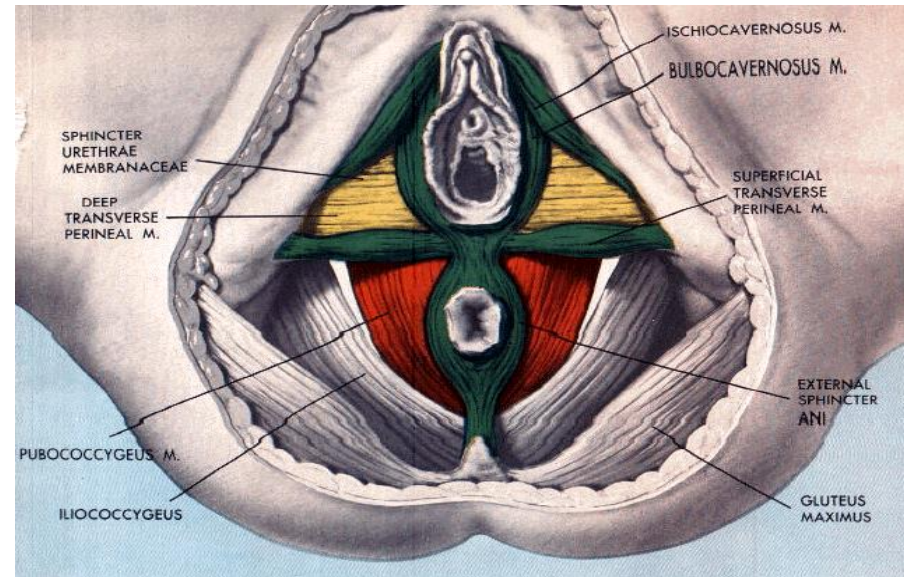
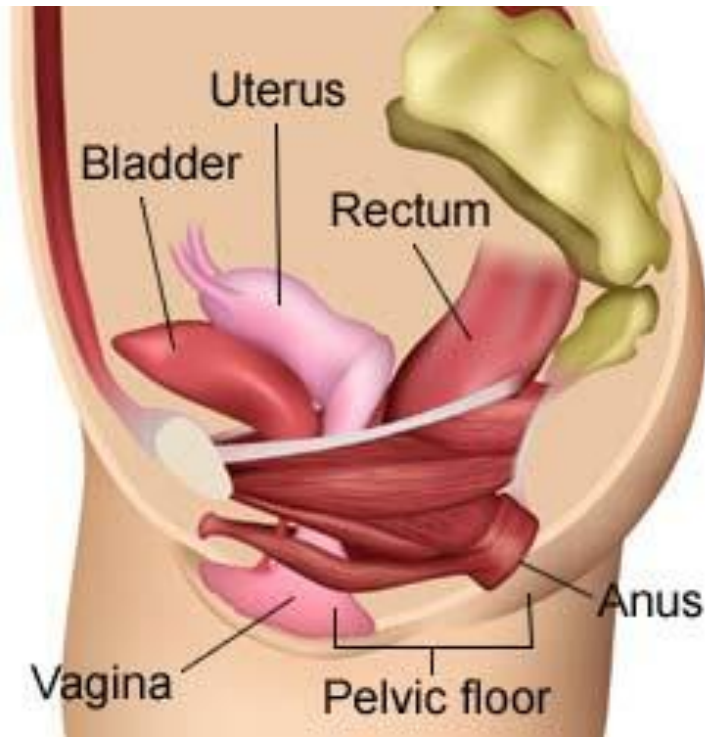
- 8 studies; 1 RCT (Mesquita et al-99)
- Poor quality
- «Based on the available evidence and quality of this evidence, non-specific exercise may or may not help to prevent or reduce diastasis of the rectus abdominal muscle during the ante- and postnatal periods»
- 11 new RCTs did not change this **statement** (Walton et al-16, Emanuelson et al-16, Kamel & Yousif et al -17, Gluppe et al-18, Tuttle et al-18, Bobowik & Dabek-18, Thabet & Alshehri -19, Keshwani et al-19, Botla & Saleh-20, Laframboise-21, Saleem et al-21)
- Dangerous exercises?
- Urgent need for high quality RCTs
- **INTERVENTION???**



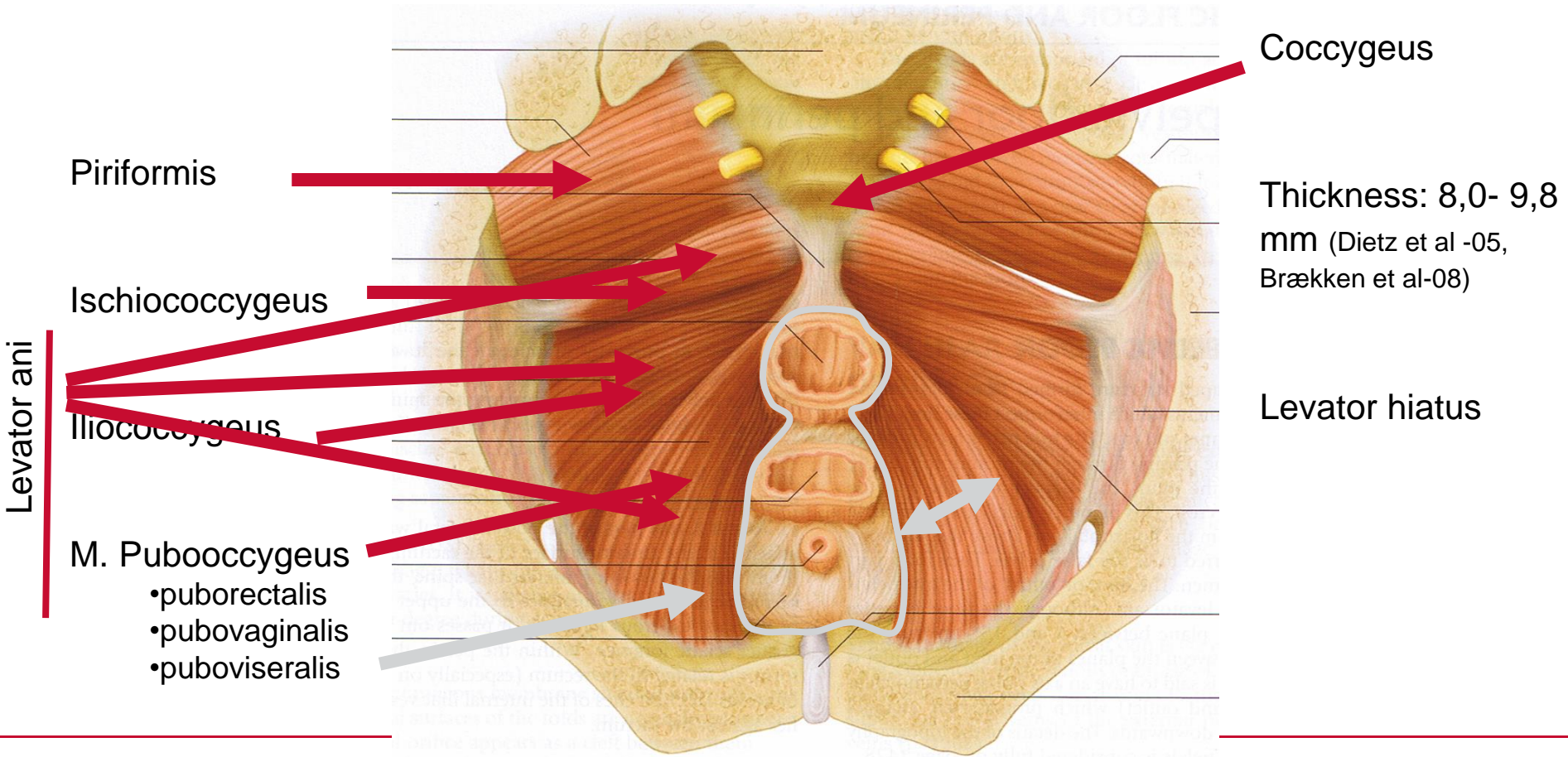
50 year old, para 2, former runner at Olympic level



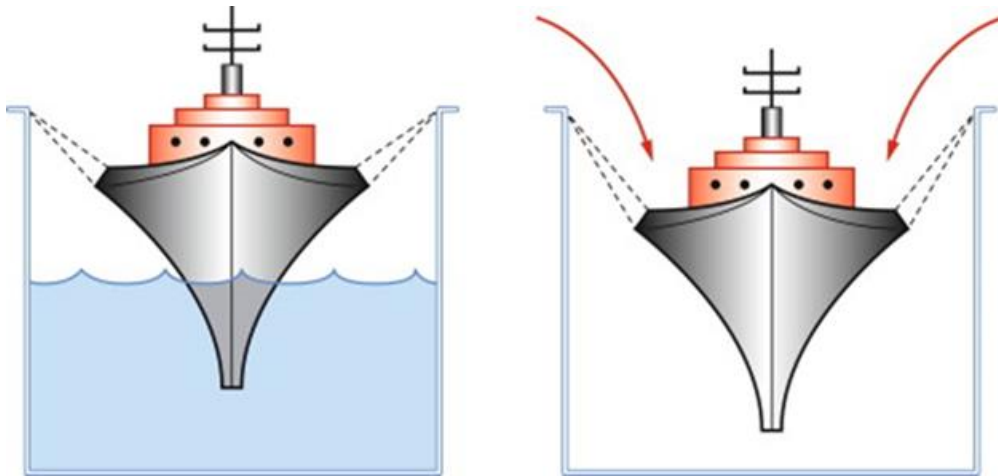
The pelvic floor; ligaments, fascia, muscles with bladder, urethra, vagina and uterus and rectum



Pelvic floor muscles (PFM)



Optimal pelvic floor muscle function; voluntary: lift and squeeze



- Form a **structural support** (anatomical location, cross sectional area, constriction of hiatus)
- **Prevent descent**
- Be ready for action (feed-forward loop)
- Give quick and strong **automatic** response (?)
- Be relaxed during voiding and defecation

Ability to contract PFM correctly

- > 30 % not able to contract (Benvenuti et al -87, Bø et al -88, Hesse et al -90, Dinc et al-09)
- Only 49% increased urethral pressure during contraction (Bump et al 1991)
- 25% were straining instead (Bump et al 1991)



Pre-pregnancy pelvic floor disorders (PFDs)?

Durnea et al-14

- Retrospective study at GW 15 in 1484 nulliparous pregnant women
- Australian Pelvic Floor Questionnaire
- Results:
 - Urinary dysfunction: 61 %
 - Faecal: 41 %
 - POP: 5 %
 - Sexual 41 %
- In 37 %, dysfunction was perceived as bothersome
- 57.6% had more than one type of PFD



UI in female athletes

- 28% varsity athletes Nygaard et al -94
- 31% US soldiers Davis et al-99
- 41% SUI/16% UUI elite athletes, same as controls Bø & Sundgot-Borgen -01
- 52% athletes and dancers Thyssen et al -02
- 80% /68% of trampolinists Eliasson et al -02/05:
- 28% athletes, 9.8% in physically active controls/sedentary Caylet et al-06
- 25% athletes Carls -07
- 47% athletes /48% controls Docter et al-07
- 62% long distance runners Araujo et al-08
- 30% causal athletes Simeone et al-10
- 31% elite athletes, 18% controls Vitton et al-11
- 41% basket/indoor soccer Jacome et al-11
- 73% trampolinists Da Roza et al-14
- 63% amateur soccer, 25% controls Fernandes et al-14
- 45% elite endurance Poswiata et al-14
- 66% volleyball Schettino et al-14
- 76% long distance, basket, gymnastics, 16% control Araujo et al-15
- 31% maraton/relay Abitteboul et al-15
- 52.2% amateur athletes Ameida et al-16



- 37.4% triathletes Yi et al-16
- 14.3% high impact athletes/6.1% sports clubs Hagovska et al-17, 18
- 29.6% several sports Carvalhais et al-17
- 60.8% netball Gill et al-17
- 67.8% local sport clubs Neels et al-17
- 70% high impact sports Cardoso et al-18
- 52% different sports, 27.9% on pad test dos Santos-18
- 27.8% cross fit Yang et al-18
- 41% powerlifters Wikander et al-19
- 31.8% rhythmic gymnasts Gram & Bø-19
- 50% strength/weightlifters Skaug et al-20
- 67% gymnastst/cheerleaders Skaug et al-21

Antenatal PFMT Woodley et al -20

- Treatment: uncertain whether antenatal PFMT reduces UI
- Mixed prevention and treatment:
 - 26% reduced risk in late pregnancy + mid postnatal period
- Pregnant continent women who exercise the PFM (PRIMARY PREVENTION):
 - 62% less likely to experience UI in late pregnancy
 - 29% less risk of UI 3-6 months pp
 - Insufficient evidence for effect >6-12 months pp
- Fecal incontinence: little or no effect of antenatal PFMT



PFMT included in pregnancy exercise program

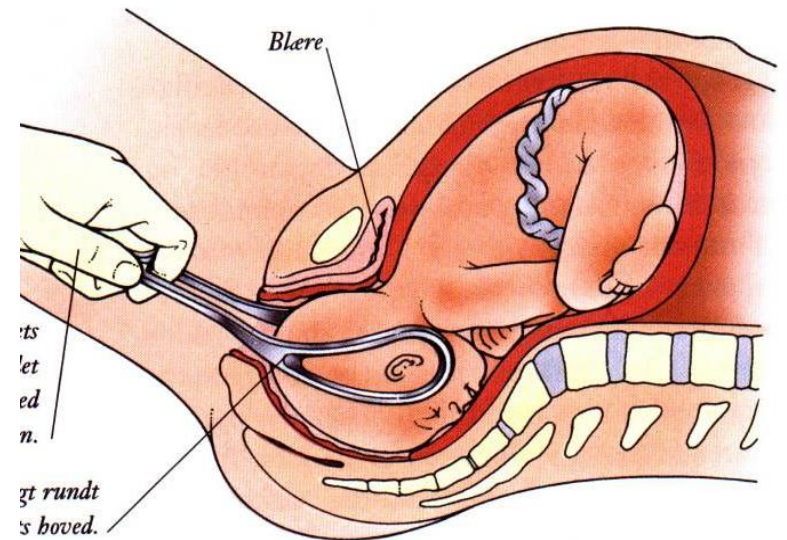
Pelaez et al 2014

- RCT: primary prevention in 169 nulliparous pregnant women.
10% loss to follow up
 - N=63 Exercise class for 22 weeks 3 times/week
 - N=89 Usual care
- ICIQ-UI-SF
- Results
 - Frequency of UI: never: 95.2% vs 60.7% ($p < .001$)
 - Amount of leakage: none 95.2% vs 60.7% ($p < .001$)
 - ICIQ score after: 0.2 (1.2) vs 2.7 (4.1) ($p < .001$)
 - **Effect size: 0.8**



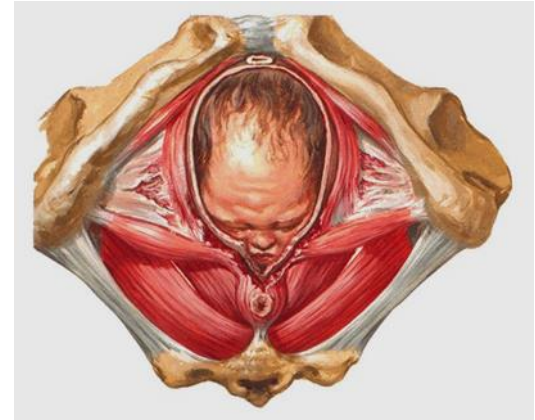
Does PFMT during pregnancy negatively affect childbirth? Du et al-15

- 12 studies (RCTs / quasi-RCTs) involving 2243 primigravida women and lasted from 8-20 weeks. PFMT began in GW 20.
- Results:
 - PFMT sign **shortens 1st (mean 28 min) and 2nd stage (mean 10 min)** of labor in primigravida
 - Antenatal PFMT **does not increase the risk of episiotomy, instrumental vaginal delivery and perineal laceration in primigravida**
 - Time to abandon the myth; Too tight to give birth? Bø et al - 13



Childbirth as inciting factor for pevic floor dysfunction

- Stretch ratio exceeds by 3 times the largest non-injurious stretch ratio of skeletal muscle
- Damage to:
 - Peripheral nerves
 - Muscle 15-36% DeLancey et al-03, Dietz & Lanzarone -05, Shek & Dietz -10
 - Collagen
- PFM
 - >50% ↓ PFM strength & endurance 6 weeks pp
 - Major injury: 47% ↓ strength/ endurance than non-injured Hilde et al -13, Hilde et al-13
 - 54% incorrect PFMc first week pp, 45% of those convinced correct, failed, 74% learned Vermandel et al-15



PFD 12 months pp in primipara Durnea et al-14
UI: 54%
FI: 9.1%
POP: 14%
Dysparuni: 44%

Cochrane review postnatal PFMT for UI

Woodley et al -20

- Unclear whether postnatal women with persistent UI who received PFMT were less likely to have UI >6-12 months after delivery
 - 4 RCTs (Wilson et al-98, Glazener et al-01, Dumoulin et al-04, Sigurdardottir et al-20) all with pos short term effect
- Mixed prevention and treatment: Considerable uncertainty
- Fecal incontinence:
 - Treatment AND mixed population: uncertain results
 - Few trials



WHO 2020: Guidelines on physical activity and sedentary behaviour

For pregnant and postpartum women pelvic floor muscle training may be performed on a daily basis to reduce the risk of urinary incontinence



Exercise principles for PFMT

- Search, find, learn, TRAIN
- Huge difference in training dosage
- Follow general strength training principles ACSM Garber et al-11
 - 8-12 close to maximum voluntary contractions x 3
 - 3-4 times/week
 - Holding time 6-8 sec?
 - Add 3-4 fast contractions on top
 - Legs apart (Mørkved et al-03, Stafne et al-12)
- After birth; search, find, learn train...only gentle contractions may be possible in the beginning!



Return to sport postpartum?

- 40 Norwegian elite athletes and 80 controls Bø & Backe-Hansen -07
 - 77% continued to compete at the same level after childbirth
 - Within the first 6 weeks postpartum, 12 (38%) of the elite athletes started jogging compared with 2 (4.3%) of non-athletes
 - 6 weeks postpartum
 - UI: 29%
 - LBP: 9.7%
 - PGP: 12.9%
 - No difference between athletes and controls
- 34 Norwegian elite athletes and 34 active controls Sundgot-Borgen et al-19
 - Results
 - 71% of athletes and 32% of controls returned to their sport and exercise routines within 6 weeks pp
 - UI: no difference between athletes and controls; 21% vs 27%, $p=0.78$
 - In 44% of athletes; performance level the same and in 15% better at 3–9 months pp compared with the last 6 months non-pregnant period
 - 26% reported experienced decrease in performance level and 15% did not know

Influence of early PP exercise and PFD 12 months pp

Tennfjord et al -20

- Prospective cohort (n=277)
- At 6 weeks postpartum, 57 primiparous women classified as exercisers (exercising ≥ 3 times at ≥ 30 min/wk) were compared with 120 non-exercisers (mean age = 29 years, SD = 4.3)
- Results
 - No diff in VRP, PFM strength and endurance in exercisers vs non exercisers at 6 weeks pp or symptoms of UI and POP at 12 months pp
 - BMI 25 and 29.9, OR = 2.2 [95% CI = 1.0 to 4.7] and >30 , OR = 3.3 [95% CI = 1.2 to 9.4] associated with SUI
 - Strenuous occupational work associated with POP (OR = 3.0 [95% CI = 1.2 to 7.3])



Return to running, and running related SUI postpartum

Moore et al-21

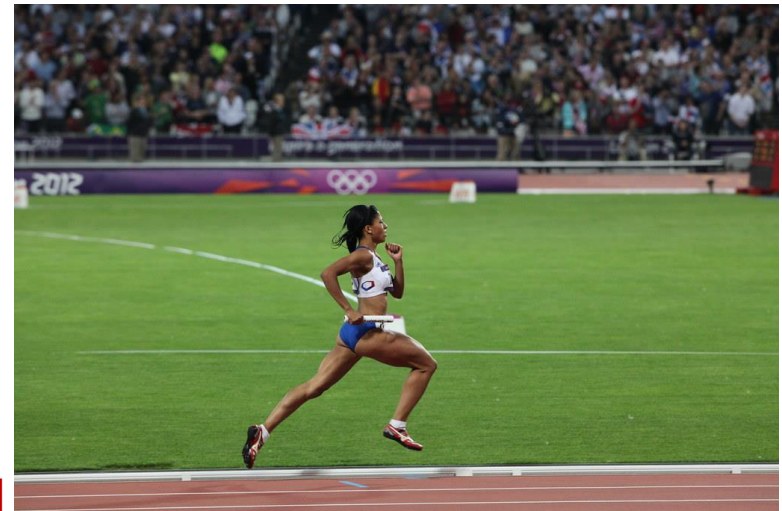
- Online survey of 881 pp women within 2 years pp, running ≥ 1 /week pre-pregnancy
- On average return to running at 12 weeks pp, 84% experienced pain in lower limbs, lower back, pelvis, abdomen, breasts, thoracic or coccyx while running
- Increased odds of return to running PP:
 - Running during pregnancy
 - Lower fear of movement
 - High weekly running volume pre-pregnancy
 - No feeling of vaginal heaviness



Return to running, and running related SUI postpartum cont

Moore et al-21

- Increased odds of returning to prepregnancy level
 - Low pre-pregnancy weekly running volume
 - Lower fear of movement
 - > 1 child
 - Being younger
 - Shorter time to running pp
- Increased odds of suffering from running related SUI pp
 - Running related SUI before and during pregnancy
 - Having returned to postpartum running
 - Having vaginal delivery



Pregnant and postpartum women engaged in strength training

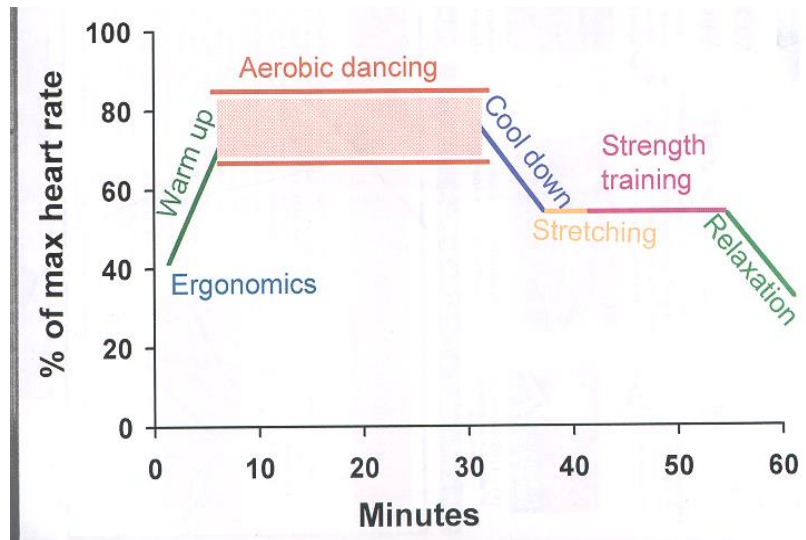
Prevett et al-23

- Cross-sectional survey: 679 recreational athletes in CrossFit™ or weight lifting
- 66% no complications during pregnancy or delivery
- **57% reported UI following pregnancy**
- Most engaged in supine and Olympic lifting, 34% did Valsalva during pregnancy
- RETURN to sport postpartum
- Weightlifting: 89%: mean 3.2 (\pm 3) months
- Olympic lifting: 81%: mean 4 (\pm 3.4) months
- Valsalva: 62%: mean 4.5 (\pm 3.6) months
- Conclusion: pelvic floor health outcomes were not altered whether they engaged in, or avoided Olympic lifting, Valsalva or supine weightlifting



Continued: 218% odds of returning to weight-lifting post delivery

The Norwegian Aerobic Fitness Model (Bø & Kamhaug, Universitetsforlaget 1989)



Exercise class for pregnant and postpartum women, GIT model Bø & Kamhaug 1989

- ≥ 30 minutes low-impact cardio-respiratory/aerobics
- Flexibility training
- Strength training
 - Pelvic floor muscles
 - Thigh/arms/abdominals (?), upper and lower back
 - Teach proper lifting techniques/squat
- Balance training
- Relaxation
 - Stretching of back, neck and shoulders
 - Breathing and relaxation



WCP/ IOPT **P**WH: Women's Health Physiotherapists AND **E**xercise scientists

Barselopproret.no



Thank you for the attention!