GEMs
GOOD EVIDENCE MATTERS

GEMs of the Week
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What's in this week's issue?

Week of December 5 - 9, 2022

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- Can Using Lighter Training Loads with High Intensity Effectively Lose Fat While Gaining Muscle?

Do Breathing Exercises Improve Quality of Life for Adult Patients with Asthma?

GEMs GOOD EVIDENCE MATTERS SPOTLIGHT

Breathing Exercises for Adults with Asthma

Santino TA, Chaves GS, Freitas DA, Fregonezi GA, Mendonça KM. Breathing exercises for adults with asthma. *Cochrane Database Syst Rev*. 2020;3(3):CD001277. Published 2020 Mar 25. doi:10.1002/14651858.CD001277.pub4

KEY TAKEAWAY: Breathing exercises may improve quality of life in adults with asthma.

STUDY DESIGN: Systematic review of 22 RCTs (N=2,880)

LEVEL OF EVIDENCE: STEP 2 (downgraded due to low quality of included studies)

BRIEF BACKGROUND INFORMATION: Asthma is a common condition affecting adults. Breathing exercises are a cheap and safe attempt to control asthma symptoms and improve quality of life.

PATIENTS: Adults with mild to moderate asthma

INTERVENTION: Breathing exercises

CONTROL: No active control or asthma education

PRIMARY OUTCOME: Quality of Life

Secondary Outcomes: Hyperventilation and asthma symptoms, lung function

METHODS (BRIEF DESCRIPTION):

- Searched The Cochrane Library, MEDLINE, Embase, PsycINFO, CINAHL, AMED, respiratory journals, and meeting abstracts for articles to be included in the review.
- Adults with asthma were diagnosed by a physician or by meeting internationally recognized criteria for diagnosis.
- Interventions included yoga, breathing exercises such as pranayama, deep diaphragmatic breathing, Buteyko method, and Papworth method.
- There was wide variability between studies on how patients received the intervention: professionally guided sessions, individual vs group sessions and home video or book learning.
- The primary outcome of quality of life was evaluated using the Asthma Quality of Life Questionnaire (AQLQ) and MiniAQLQ—scores ranged from 1 to 7, higher scores indicate better quality of life.
- Secondary outcomes: hyperventilation symptoms and asthma symptoms were evaluated by:
  - Nijmegen Questionnaire—score of 24 or above out of 64 suggests a diagnosis of hyperventilation syndrome
  - Asthma Control Questionnaire (ACQ)—scores from 0-6, higher scores indicate more uncontrolled symptoms
- Lung function was evaluated by measuring FEV1.

INTERVENTION (# IN THE GROUP): Not available

COMPARISON (# IN THE GROUP): Not available

FOLLOW UP PERIOD: Varied from less than three months to over six months

RESULTS:

Primary Outcomes –

- Breathing exercises improved quality of life compared to inactive controls (4 studies, N=974; MD 0.42; 95% CI, 0.17–0.68).
- Breathing exercises improved quality of life compared to asthma education at 4 to 6 months (1 study, N=183; MD 0.38, 95% CI, 0.08–0.68).
  - The results were not statistically significant at three months.

Secondary Outcomes –

- Breathing exercises improved hyperventilation symptoms compared to inactive controls at 4 to 6 months (2 studies, N= 118; MD –3.2, 95% CI, –6.1 to –0.13).
  - The results were not statistically significant at greater than six months.
- Breathing exercises improved lung function compared to inactive control (5 studies, N=618; MD 6.9%, 95% CI, 5.0– 8.7).
- Breathing exercises improved hyperventilation symptoms compared to asthma education at 4 to 6 months (1 study, N=183; MD –3.2, 95% CI, –5.4 to –0.97).

LIMITATIONS:

- Certainty of evidence was overall low based on low quality of included studies and $I^2 > 50\%$ indicating substantial heterogeneity.

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Evaluating Risk of Cardiovascular Outcomes in Patients Starting Different Diabetes Medication

Cardiovascular Outcomes in Patients Initiating First-Line Treatment of Type 2 Diabetes with Sodium-Glucose Cotransporter-2 Inhibitors Versus Metformin: A Cohort Study

Shin H, Schneeweiss S, Glynn RJ, Patorno E. Cardiovascular Outcomes in Patients Initiating First-Line Treatment of Type 2 Diabetes with Sodium-Glucose Cotransporter-2 Inhibitors Versus Metformin: A Cohort Study. *Ann Intern Med*. 2022;175(7):927-937. doi:10.7326/M21-4012

KEY TAKEAWAY: Patients who start an SGLT2 inhibitor have a lower risk of hospitalizations for heart failure but a similar risk of hospitalizations for MI or stroke than patients who start metformin.

STUDY DESIGN: Prospective population-based cohort study

LEVEL OF EVIDENCE: STEP 3

BRIEF BACKGROUND INFORMATION: SGLT2 inhibitors have been shown to reduce cardiovascular outcomes when compared to placebo but have not been compared to metformin in this regard. SGLT2 inhibitors have recently become recommended treatment as first line agents for patients who have type 2 diabetes as well as cardiovascular disease (CVD). This is relevant for primary care as historically patients with a history of CVD have been excluded from trials examining the effects of SGLT2 inhibitors on cardiovascular outcomes, and this information is critical given diabetes and cardiovascular disease are co-morbid conditions.

PATIENTS: Adults with type II diabetes

INTERVENTION: SGLT2i

CONTROL: Metformin

PRIMARY OUTCOME: Combination of hospitalizations for MI, stroke, and mortality, and a combination of hospitalizations for heart failure and mortality

METHODS (BRIEF DESCRIPTION):

- Data was collected from three different healthcare databases, Optum Clinformatics, IBM Market Scan, and Medicare. Adults older than 18 years old with a diagnosis of diabetes were included.
- Patients who were included in this study were started either on metformin or an SGLT2 inhibitor for diabetic control. Patients who started both simultaneously were excluded.
- There were more patients who were started on metformin than SGLT2 inhibitors so propensity score matching was used to limit confounding bias and emulate randomization.
- The primary outcomes of the study included the combination of hospitalizations for MI, stroke, and all-cause mortality and the combination of hospitalizations for heart failure and all-cause mortality.

INTERVENTION (# IN THE GROUP): 9,334

COMPARISON (# IN THE GROUP): 819,973

FOLLOW UP PERIOD: Started after entry into the study and ended after an outcome, discontinuing the medication, end of enrollment of insurance, death, or end of study period

RESULTS:

- A similar risk in hospitalizations for MI, stroke, and all-cause mortality was noted in patients who started SGLT2 inhibitors when compared to patients who started metformin for diabetic control (HR 0.96; 95% CI, 0.77–1.2).
- Patients who started SGLT2 inhibitors had a lower risk of hospitalization for heart failure and all-cause mortality (HR 0.80; 95% CI, 0.66–0.97) when compared with patients who had initiated metformin.

LIMITATIONS:

- The study could not completely account for confounding variables, including socioeconomic status and diabetic disease severity.
- In addition, the study was not randomized, though propensity score matching was used to attempt this effect.

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Adding Spinal Manipulative Therapy in Conjunction with Home Stretching Exercises as Treatment for Recurrent and Persistent Neck Pain

The Effect of Two Weeks of Spinal Manipulative Therapy and Home Stretching Exercises on Pain and Disability in Patients with Persistent or Recurrent Neck Pain; A Randomized Control Trial

Bakken AG, Eklund A, Warnqvist A, O'Neill S, Axén I. The effect of two weeks of spinal manipulative therapy and home stretching exercises on pain and disability in patients with persistent or recurrent neck pain; a randomized controlled trial. *BMC Musculoskelet Disord*. 2021;22(1):903. Published 2021 Oct 27. doi:10.1186/s12891-021-04772-x

KEY TAKEAWAY: Combining spinal manipulative therapy with neck stretching exercises adds no additional benefit in improvement of intensity or quality of recurrent or persistent neck pain.

STUDY DESIGN: Multicenter, single-blinded randomized control trial

LEVEL OF EVIDENCE: STEP 2

BRIEF BACKGROUND INFORMATION: With persistent and recurrent neck pain being both a common and debilitating condition, no specific treatment approach is recommended, rather patients are usually offered a list of exercises, therapies, and other activities. While treatment of neck pain is multi-modal with the two first line management recommendations being activity and manual therapy, the specific combination of these treatments has not been studied and could be used together for patients to receive optimal improvement.

PATIENTS: Adults with persistent or recurrent neck pain

INTERVENTION: Spinal manipulative therapy in addition to home stretching exercises

CONTROL: Home stretching exercises only

PRIMARY OUTCOME: Pain intensity and pain quality

Secondary: Disability and health-related quality of life

METHODS (BRIEF DESCRIPTION):

- Inclusion criteria:
  - Recurrent (at least one previous episode) and persistent (more than six months) neck pain
  - No chiropractic treatment the previous three months
  - Minimum of 18 years of age
  - Able to read and write in Swedish
- 131 participants were randomized into two groups.
- All participants were scheduled for five visits during the two weeks. Everyone received home stretching exercises to complete for two weeks, while the intervention group received additional four treatments of spinal manipulative therapy within the two weeks during their visits, with the 5th and final visit to just collect results.
  - SMT was performed by a chiropractor with either HVLA or mobilization techniques.
  - All participants reported completion of exercises in a diary to measure adherence.
- Primary outcome of pain quality was measured with the (NRS-11) questionnaire (0–11, higher scores indicating worse pain) and intensity via the McGill Pain Questionnaire (0–78, higher scores indicating worse pain).
- All participants received EQ-5D that measures Health-related quality of life through defining health status and pain experiences.
- All patients were also given the Neck Disability Index (NDI) measuring level of disability from pain's effects on daily life.

INTERVENTION (# IN THE GROUP): 66

COMPARISON (# IN THE GROUP): 65

FOLLOW UP PERIOD: Two weeks

RESULTS:

- Pain quality equally improved in both the SMT+home exercise group and the home exercise alone group (–1.1 vs –1.1, *P=.31*).
- Pain intensity equally improved in both the SMT+home exercise group and the home exercise alone group (–0.9 vs –1.9, *P=.38*).
- There was no statistical difference between the two groups in any of the outcomes measured.

LIMITATIONS:

- Exclusion criteria included many common medical conditions, including CVD, hypertension, diabetes, obesity, and beta-blocker or antidepressant use.
- Different chiropractors utilized in the study and SMT was tailored to each individual patient.
- Not double blinded study, as clinicians were aware of what treatment they were providing.

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Can Using Lighter Training Loads with High Intensity Effectively Lose Fat While Gaining Muscle?

Changes in Body Composition and Strength after 12 Weeks of High-Intensity Functional Training with Two Different Loads in Physically Active Men and Women: A Randomized Controlled Study

Kapsis DP, Tsoukos A, Psarraki MP, Douda HT, Smilios I, Bogdanis GC. Changes in Body Composition and Strength after 12 Weeks of High-Intensity Functional Training with Two Different Loads in Physically Active Men and Women: A Randomized Controlled Study. *Sports (Basel)*. 2022;10(1):7. Published 2022 Jan 4. doi:10.3390/sports10010007

KEY TAKEAWAY: Low load resistance training and moderate load resistance training are effective at gaining lean body mass and reducing fat mass.

STUDY DESIGN: Randomized controlled trial

LEVEL OF EVIDENCE: STEP 2

BRIEF BACKGROUND INFORMATION: Low muscle mass, sarcopenia, is associated with multiple disease states such as diabetes, hypertension, and obesity. Resistance training is associated with multiple health benefits believed to be secondary to increasing lean body mass. Historically, it was believed that adding muscle could only be achieved by lifting heavy weights. This may be a barrier for some patients to engage in regular exercise.

PATIENTS: Adults 20-40 years old

INTERVENTION: Moderate load resistance training (ML) vs low load resistance training (LL)

CONTROL: No exercise

PRIMARY OUTCOME: Lean body mass (LBM) and fat mass.

Secondary Outcome: Strength

METHODS (BRIEF DESCRIPTION):

- 41 people were assessed for eligibility and 38 met inclusion criteria and were randomized.
- Inclusion criteria: Healthy females or males, ages 20-40, BMI <30, regular recreational activity
- Exclusion criteria: engaged in a weight loss program, heavy resistance training, or dietary supplements; history of endocrine or metabolic disorders or early cardiac mortality
- Subjects were placed into three separate groups including a lower load exercise group (30% of 1 rep max), a moderate load exercise group (70% of 1 rep max), and a no exercise group.
- Subjects completed five sequential exercises (bench press, back squat, bent over row, deadlift, shoulder press) three days a week.
- Each exercise was 30 seconds, as many reps as possible, followed by a 30 second break. After a round consisting of all five exercises was complete, a 2.5-minute break occurred. Subjects completed four rounds in total.
- Body composition and muscle strength were measured at six and 12-week intervals. Bioelectrical impedance was used to determine lean body mass (LBM) and fat mass (FM) at baseline, six weeks, and 12 weeks.

INTERVENTION (# IN THE GROUP):

- Moderate Load Group: 13
- Lower Load Group: 13

COMPARISON (# IN THE GROUP): 12

FOLLOW UP PERIOD: 12 weeks

RESULTS:

Primary Outcomes –

- At 12 weeks LBM had increased from baseline in the LL group (1.1 ±0.65 kg, *P*=.03).
- At 12 weeks LBM had increased from baseline in the ML group (1.3 ±1.6 kg, *P*=.002).
- LL resulted in fat mass loss at 12 weeks compared to baseline (−3.2 ±1.6 kg; *P*<.001).
- ML resulted in fat mass loss at 12 weeks compared to baseline (−1.6 ±1.4 kg; *P<.001*).

Secondary Outcomes –

- Strength equally increased in ML and LL groups at 12 weeks in bench press, squat, bent over row and deadlift.

LIMITATIONS:

- Using bioelectrical impedance to measure fat and lean body mass.
- Lack of data regarding sleep and macronutrients.
- A baseline physically active population may not apply to all patient populations.

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