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[ALERT]

EXERCISE

ABSTRACT & COMMENTARY

Exercise and Risk of Falls in Older Adults

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Dr. Barghgir and Dr. Selfridge report no financial relationships relevant to this field of study.

SYNOPSIS: The authors of this meta-analysis of 46 multinational randomized, controlled trials exploring the association between long-term exercise training and risk of serious outcomes in adults older than 60 years of age noted a statistically significant reduction in risk for some fall-related outcomes depending on the frequency and intensity of exercise training.

SOURCE: de Souto Barreto P, Rolland Y, Vellas B, et al. Association of long-term exercise training with risk of falls, fractures, hospitalizations, and mortality in older adults: A systematic review and meta-analysis. *JAMA Intern Med* 2019;179:394-405.

The health benefits of regular physical exercise for adults include reduced all-cause mortality, prevention of chronic disease, and optimized management of, and improved outcomes for, chronic disease. Optimizing body weight/composition, maintaining or increasing muscle mass and strength, and improving mood, sleep, and neurocognitive function are additional benefits. The strength of evidence is substantial enough that multiple federal agencies support state and local programs to promote physical activity and exercise for all ages.¹

Falls are a significant cause of morbidity and mortality in the elderly, leading to fractures, hospitalizations, decreased functional status, and reduction in quality of life.² The Centers for Disease Control and Prevention reported that 28.7% of adults 65 years of age or older experienced falls in 2014, contributing to a total of 29 million falls for that year. Furthermore, there were 33,000 fall-related deaths documented in 2015.³ The risk of falls in the elderly is multifactorial; weakness, frailty, balance problems, cognitive decline and impairment, medication side effects, nutrition, and multiple

Financial Disclosure: *Integrative Medicine Alert's* Physician Editor Suhani Bora, MD; Peer Reviewer Eugene Lee, MD; Associate Editor Mike Gates; Editor Jason Schneider; Relias Media Editorial Group Manager Leslie Coplin; and Accreditations Director Amy M. Johnson, MSN, RN, CPN, report no financial relationships relevant to this field of study.

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GST Registration Number: RI28870672.

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Summary Points

- Exercise can significantly decrease the risk of falls and injurious falls in older adults.
- Moderate or intense exercise, two to three times per week, averaging 50 minutes per session, is recommended to reduce the risk of falls and injuries caused by falls.
- Exercise will not significantly diminish the risk of mortality, hospitalization, multiple falls, or fractures in older adults.

environmental factors increase risk.² It is no surprise that multifactorial interventions, including exercise programs, are associated with fall-related benefits.^{2,4,5} Simultaneously, safety concerns about exercise programs for the elderly have arisen from the results of the Lifestyle Interventions and Independence for Elders (LIFE) study, the largest and the longest study trial to date in sedentary older adults. The study showed increased hospitalizations and mortality in exercising elders compared with controls, although the results did not reach statistical significance.⁶

This systematic review was performed to fill an evidence gap concerning benefits and risks of long-term exercise for older adults. Data from multiple randomized, controlled trials (RCTs) were pooled and analyzed to determine the effect of long-term exercise interventions of one year or more in duration on both the risk and consequences of falls in adults 60 years of age or older. The data was used to determine the optimum type, intensity, frequency, and duration of exercise associated with the greatest reductions in risk of falls and fall-related adverse events. To address concerns raised by the LIFE study, they explored the risks of serious outcomes associated with exercise interventions, including hospitalizations and mortality.

For this preplanned meta-analysis, the authors performed an electronic database search, identifying 46 published studies ($n = 22,709$ participants) that met the following eligibility criteria:

- The study had to be an RCT with an exercise intervention length of one year or more (or more than 12 months or more than 48 weeks).
- The study compared the effects of at least one exercise intervention against a control comparator group that received no intervention, attention, or another active intervention.
- Participants were 60 years of age or

older at baseline, or the mean participant age was 60 years or older.

Studies investigating co-interventions were eligible if the only difference between intervention and comparator groups was the exercise intervention. Exercise interventions could include home- or group-based programs, but unsupervised exercise interventions were included only if a personalized exercise plan was provided to the participant.

Six binary outcomes were measured:

- Mortality
- Hospitalization (inpatient, 24 hours or more in duration)
- Participants who fell at least once
- Participants who fell at least twice (multiple falls)
- Participants who suffered an injurious fall (e.g., sustained head trauma, a wound, or required medical care or hospitalization for the injury)
- Fractures

The mean participant age was 73.1 years, 66.3% of participants were women, and most trials involved community dwellers. Sixteen of the studies involved patients with specific clinical conditions or diseases. RCTs included both parallel (35) and cluster (11) designs. Multicomponent exercise (aerobic plus strength plus balance training) was the most common exercise intervention (29 studies). Aerobic exercise alone was studied in eight trials, and strength training alone was studied in five trials. The mean intervention length for the studies was 17 months.

Data from RCTs with attrition rates greater than 40% and those with exercise compliance rates of less than 30% did not enter into the primary analysis, but were added in sensitivity analyses. Trials with no data available for a specific outcome were not included in analyses of data for that outcome. Exploratory meta-regressions were performed to

determine which aspects of the exercise intervention associated most strongly with the effect size of the outcomes. Exercise variables included frequency (two to three times per week vs. fewer than twice per week); volume (fewer than 120 minutes per week, 120-180 minutes per week, and more than 180 minutes per week); intensity (vigorous vs. moderate); and type (aerobic, strength, other type, and multicomponent). Effective exercise volume was determined separately, calculated as a product of weekly exercise volume and adherence. Multicomponent interventions that included balance training were further compared to all other exercise types combined.

Data on the primary outcomes were obtained from baseline until the end of the intervention period. Heterogeneity, using the I^2 statistic, was considered substantial for I^2 values greater than 50%. Subgroup analyses were performed to explore substantial heterogeneity, including stratifying analyses of separate study populations categorized as clinically specific, disease-specific, and non-clinically specific. Sensitivity analyses were performed to help ensure the robustness of overall meta-analysis results.

Results are summarized in Table 1. There was no statistical difference in mortality between participants in exercise groups or control groups except for sensitivity analyses restricted to clinically specific and disease-specific populations, which showed a reduced risk of mortality in exercisers (relative risk, 0.70; 95% confidence interval, 0.49-1.00; $P = 0.05$). Exercise did not affect the risk of being hospitalized; despite heterogeneity of studies ($I^2 = 59.2\%$), subgroup and sensitivity analyses were consistent with these findings. At least one fall was experienced by 43.1% and 48.2% of individuals in the exercise and control groups, respectively. Exercisers demonstrated a significantly reduced risk (12%) for becoming a faller, and a similar, but not statistically significant, relative

risk of experiencing multiple falls. Interestingly, meta-regressions for exercise frequency and effective exercise frequency more than three times weekly were associated with an increased risk of becoming a faller. Exercisers had a significantly reduced risk (26%) of experiencing injurious falls. A reduced risk of fractures also was noted in exercisers, although the results did not reach statistical significance.

■ COMMENTARY

This analysis of pooled RCT data is the first to look at the effects of long-term exercise on specific outcomes, including falls, in adults older than 60 years of age. It also is the first attempt to look at the effect of exercise on the risk of experiencing multiple falls in this age group, although the paucity of data in the selected studies relevant to this specific outcome likely limits interpretation of results. Overall results corroborate existing evidence that exercise of any duration has positive effects on fall-related outcomes. Exercising two to three times weekly appears to be the optimum exercise frequency, below which, risk reduction for fall outcomes is not apparent. A surprising finding was that exercising more than three times weekly appeared to be associated with an increased risk of falls, suggesting an optimum exercise volume for older adults, above which, risks may begin to accumulate.

The significant heterogeneity noted in the fall analyses suggest that these particular results need to be interpreted with care. Inclusion in this review of the studies that focused on clinical conditions and disease-specific populations may make it irrational to generalize advice concerning exercise volume upper limits to healthy patients with no clinical disease.

Fortunately, no increased risk of mortality, hospitalization, falls, or injurious results of falls were noted in this data analysis, helping allay concerns about exercise

Table 1. Effect of Exercise on Risk of Primary Outcome

Outcome	Risk Ratio (95% Confidence Interval)	P Value	Heterogeneity (I^2)	Meta-Regression Findings
Mortality	0.96 (0.85-1.09)	0.68	0.0%	Significantly reduced mortality risk for exercise frequency three times/week ($P = 0.01$) and effective exercise two to three times/week ($P = 0.03$) compared to fewer than two times/week
Hospitalization	0.94 (0.8-1.12)	0.005	59.2%	No significant differences
Falls	0.88 (0.79-0.98)*	0.005	50.7%	Exercise frequency more than three times/week associated with increased risk of falls ($P = 0.01$)
Multiple falls	0.86 (0.68-1.08)	0.003	60.2%	No significant differences
Injurious falls	0.74 (0.62-0.88)*	0.1	40.2%	No significant differences
Fractures	0.84 (0.71-1.00)	0.97	0.0%	No significant differences

*Statistically significant results favoring exercise

safety raised by the LIFE study. Meta-regression analyses also showed that vigorous-intensity exercise is as safe as moderate-intensity exercise.

The limitations of this review include risks of bias inherent in the original studies — blinding of subjects, allocation concealment, and blinding of outcome assessment. Some studies did not report exercise adherence, which would affect analyses of exercise volume. The average heterogeneity of studies and of analysis results was substantial, requiring caution in generalizing findings to all populations.

Nonetheless, this review supports exercise recommendations comprised of moderate-intensity multicomponent training, including balance exercises (two to three sessions weekly, 30 to 60 minutes per session) for older adults for protection against falls and adverse outcomes.

Patients can be reassured that research supports this exercise prescription as safe and effective. ■

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MINDFULNESS

SHORT REPORT

Cognitively Based Compassion Training for Parents Might Decrease Stress in Kids

By Ellen Feldman, MD

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Dr. Feldman reports no financial relationships relevant to this field of study.

SYNOPSIS: The authors of this small, randomized, controlled trial found that Cognitively Based Compassion Training, a group-based technique taught to parents, was associated with decreased hair level of cortisol (a marker of decreased stress) in children whose parents completed this training.

SOURCE: Poehlmann-Tynan J, Engbretson A, Vigna AB, et al. Cognitively Based Compassion Training for parents reduces cortisol in infants and young children. *Infant Ment Health J* 2020;41:126-144.

"We cannot always build the future for our youth, but we can build our youth for the future." — Franklin D. Roosevelt

Mindfulness is a powerful, teachable therapeutic technique useful for a variety of health outcomes, including stress reduction and overall improvement of well-being and health. Mindfulness-based stress reduction (MBSR) is one of the most widely studied, structured mindfulness-based programs. Jon Kabat-Zinn, the founder of MBSR, defines mindfulness as the “awareness that arises through paying attention, on purpose, in the present moment, non-judgmentally.”¹⁻³

While MBSR practitioners use mindfulness techniques to assist with regulation of intense mood states, Cognitively Based Compassion Training (CBCT) takes a different slant. Both techniques rely on the development of mindfulness and consequent self-awareness, but CBCT aims to use self-awareness to foster compassion and empathy. First developed for use in combating depression in college

students, CBCT has shown promise in studies involving many other populations.⁴ Poehlmann-Tynan et al noted that CBCT has not been studied in parents. Postulating that strengthening compassion and empathy could decrease the stress of parenting, they decided to investigate whether this technique could help with parental mindfulness, self-compassion, stress, and/or child stress levels.

Initially, 28 parents of children aged 9 months to 5 years were randomized to an intervention group ($n = 14$) and a wait list control group ($n = 14$). After the initial cohort completed a course of CBCT, the wait list group, along with 11 new parents, were invited to participate in a second cohort group. Thus, 39 patients overall participated in the study, with 25 receiving active intervention. Most of the volunteer participants were married, associated with an early childcare center at a teaching university,

highly educated, and came from higher socioeconomic backgrounds.

CBCT was administered for a total of 20 hours over eight to 10 weeks (depending on the cohort). Hair samples and self-administered questionnaires were collected pre- and post-intervention. The following standardized tests were completed and scored based on the responses to the questionnaires:

- Calgary Symptoms of Stress Inventory (perceived symptoms of stress)
- Parenting Daily Hassles Scale (perceived parenting stress)
- Self-Compassion Scale (parental self-compassion)
- Five Facet Mindfulness Questionnaire (parental mindfulness).

RESULTS

Post-intervention scores on each standardized scale showed no evidence of a significant change in the intervention group or in the control group. Post-intervention hair cortisol concentration (HCC) in parents increased mildly in both the intervention and control groups, without any evidence of a significant intervention effect. However, there was a significant difference in child HCC post intervention. Children of parents who received CBCT showed a pooled mean decrease in cortisol concentration of -143.26 pg/mg, whereas children of parents in the control group showed a pooled mean increase in cortisol concentration of 102.56 pg/mg; $P = 0.041$.

It is important to realize this was a preliminary study with only a small number of participants from homogeneous backgrounds. Clearly, a more diverse pool of subjects would help determine if results can be generalized. Additionally, although HCC and the relation to stress in adults is well-documented, it is a relatively new concept for children and needs more research to establish clear norms in this demographic.⁵ We do know that prolonged elevation of cortisol in childhood is linked with exposure to adverse childhood events. Additionally, we know that cortisol elevation over time may adversely affect hippocampal functioning and result in long-lasting difficulties with memory, learning, and regulation of mood. Prolonged elevation of cortisol can inhibit the immune system and elevate glucose, leading to inflammation in multiple areas.⁶ This study by Poehlmann-Tynan et al points to a possible pathway to prevent or reverse elevation of cortisol via parenting techniques, providing a promising avenue for future research.

The results bring up many intriguing ideas for the primary care physician or pediatrician working with young children. It is notable that the parents in this study were healthy volunteers and not a group with specific parenting problems or health concerns. Not all parents in this position will be motivated or have time to participate

Summary Points

- Cognitively Based Compassion Training (CBCT), a meditation-based intervention using mindfulness and focused on building compassion and empathy, was administered to groups of volunteer parents for a total of 20 hours over eight to 10 weeks. In all, 39 volunteer parents of children aged 9 months to 5 years were randomized into either the intervention ($n = 25$) or wait list control group ($n = 14$).
- The goal of the study was to determine if CBCT in parents was associated with decreased level of stress in children as measured by hair cortisol concentration (HCC), and/or with a decrease in parental levels of stress, self-compassion, and mindfulness.
- Parental CBCT was associated with a significant decrease in HCC in children ($P = 0.041$), but there was no clear association with changes in parental HCC or other measures of parental stress, self-compassion, or mindfulness.

in group therapy to enhance skills. In addition, CBCT may not be readily available or easily affordable in many communities.

However, a provider is on solid ground telling parents there is suggestive evidence that enhancing parental empathy and compassion can help decrease stress in young children. In fact, there may be multiple ways for parents to gain these skills — this study looked at only one intervention. These results also serve to remind the provider to consider not only the health needs of the identified patient, but the intertwined needs of children and caregivers. This unique perspective allows more robust interventions that can affect wellness for the entire family. ■

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ABSTRACT & COMMENTARY

Examining Ginger for Ulcerative Colitis

By David Kiefer, MD

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Dr. Kiefer reports no financial relationships relevant to this field of study.

SYNOPSIS: For people with mild-to-moderate ulcerative colitis and who have symptoms and serum markers of inflammation and oxidation, some preliminary findings demonstrate both benefit and no difference when using 2 grams of ginger daily for 12 weeks vs. placebo.

SOURCE: Nikkhah-Bodaghe M, Maleki I, Agah S, et al. *Zingiber officinale* and oxidative stress in patients with ulcerative colitis: A randomized, placebo-controlled, clinical trial. *Complement Ther Med* 2019;43:1-6.

The scientific community does not often see clinical trials studying common herbs with a long history of traditional use. There is less of a financial incentive to invest in an expensive research study if positive results lead to people simply purchasing plants from a grocery store or local herbal market or pharmacy. Yet, plants such as ginger long have had promising anecdotal results, and fitting physiological benefits as well. Add these together, and it is exciting to see the efforts of this research group examining the effects of orally dosed powdered ginger on patients with mild-to-moderate ulcerative colitis.

The use of ginger in this capacity dovetails with accumulating thought that ginger has anti-inflammatory effects and the pathophysiology of ulcerative colitis initiation and flares, as cited by the authors.¹ To explore this possible therapeutic effect, the investigators enrolled 64 people in the study and randomly allocated half to a control group and half to a ginger therapy group. Adults with mild-to-moderate ulcerative colitis (as per histopathology) were recruited from three gastroenterology clinics in Iran.

Possible participants were excluded from the trial if they were pregnant or lactating; had cancer, any other intestinal diseases, or infections; or had “... other inflammatory ... autoimmune ...” diseases, although the latter were not specified. Patients also were excluded from the study if they were taking pharmaceuticals, such as antihistamines, blood thinners, calcium channel blockers, non-steroidal anti-inflammatory drugs, or birth control pills, in the month prior to study’s inception.

As the study progressed, if participants had a disease flare necessitating hospitalization or participants failed to consume at least 90% of the capsules, they also were excluded. Statistically, it is unclear if the later exclusions were still included in the final data analysis as intention-to-treat. Although the authors stated the study

Summary Points

- This was a randomized, double-blind, placebo-controlled trial in 64 people with mild-to-moderate ulcerative colitis.
- The ginger group received 500 mg capsules of dried ginger rhizome and was instructed to take two capsules twice daily.
- There was no intention-to-treat analysis, and data in 46 of the remaining participants showed via symptom questionnaires and blood tests a mixture of no difference from the placebo group to a slight improvement in symptoms and serum estimates of oxidation.

was double-blind, they did not detail the specifics of that blinding.

Culinary ginger rhizome (*Zingiber officinale*) was harvested from a farm, dried, and powdered; 500 mg was then put into each capsule for use in this study. The treatment group was instructed to consume two capsules with breakfast and two capsules with dinner over the course of the 12-week study. The placebo capsules contained maltodextrin. No commentary was made about whether the participants were able to guess which group they were in — that is, the similarity of the placebo and ginger capsules.

The study participants were visited at baseline (time = 0), six weeks, and 12 weeks, and were asked to not change their diet or their activity level significantly during that 12-week period. The authors measured height and weight and administered questionnaires at three times during the study. (See Table 1.) Of note, the Simple Clinical Colitis Activity Index Questionnaire (SCCAIQ) was the primary

Table 1. Questionnaires Administered to Participants at 0, 6, and 12 Weeks

Quesitonnaire	Data Collected
Three-day food recall	Macro and micronutrients
Inflammatory Bowel Disease Questionnaire-9	Quality of life; score from 9-63 total points (7 points for each of nine questions; higher score is better)
Simple Clinical Colitis Activity Index	Disease activity; score between 0-19, with higher scores indicating more severe disease

outcome variable. In addition, laboratory tests were taken and analyzed for total serum antioxidant activity, serum malondialdehyde (MDA) (this compound is a byproduct of omega-6 fatty acid lipid peroxidation and can indicate the presence of oxidative stress in the body), and possibly cholesterol, the latter being mentioned in a table but not specifically discussed in the text.

There were a significant number of dropouts from the study. In the control group, of the 32 original participants, four dropped out at the six-week mark (two refused to continue, one had constipation, and one had bloody diarrhea). In the treatment group, there were eight dropouts (five refused to continue, one had heartburn, and two had bloody diarrhea). In the ensuing six weeks, an additional four and two people refused to continue, respectively.

Data were analyzed for 22 people in the ginger treatment group and 24 people in the placebo group — the numbers left after the dropouts and intrastudy exclusions as described above. Among these 46 people, baseline measurements were equal and remained similar over the course of the study — with one exception. People in the control group significantly decreased their fiber intake over the 12 weeks. Blood testing revealed no difference in serum total antioxidant activity between the two groups at baseline or after the 12 weeks.

In contrast, although the serum MDA levels were similar for the ginger group and placebo group at baseline (8.33 and 7.88, respectively), after 12 weeks, the ginger group's level of MDA had decreased significantly ($3.87, P < 0.001$), whereas the control group's level was not significantly lower (6.38). Comparatively, too, these 12-week values were different from each other ($P < 0.001$).

With respect to the questionnaires, the overall Inflammatory Bowel Disease Questionnaire-9 (IBDQ-9) score was unchanged over the 12 weeks for each group, and there was no significant difference between the ginger and control groups. When subsets of the IBDQ-9 were analyzed, the stool frequency score and the bowel distress and cramp score were slightly better in the ginger group at

Table 2. Simple Clinical Colitis Activity Index Questionnaire Results

Patient Group	Baseline	6 Weeks	12 Weeks
Ginger	7.6 ($P = 0.233$)	6.0 ($P = 0.825$)	4.05 ($P = 0.017^*$)
Placebo	6.2	5.8	5.6*

*Statistically significant values

12 weeks compared to the control group ($P = 0.041$ and 0.029, respectively). Gas excretion of bowel scores and flatulence scores were similar between the two groups. The SCCAIQ score is detailed in Table 2, essentially showing some improvement in the ginger group vs. the control group, but only at the 12-week mark.

There was no information provided about adverse effects other than the symptoms that developed in some of the participants who dropped out of the study.

■ COMMENTARY

This study had huge potential. The intervention (ginger) was compelling and tied into the pathophysiology of ulcerative colitis. The herbal dose (1g to 4 g mentioned in the literature for upper gastrointestinal symptoms) and form (rhizome) were correct, and the sample size and statistical power seemed appropriate.²

It is disappointing, then, to see that it is likely that the final analysis was done on the 46 people who completed the trial, not the 64 enrolled. The failure to use an intention-to-treat statistical analysis on the original 64 represents an important failure in the methodology, especially for such a small study. Essentially, whether they meant to, the authors "cherry picked" data, so we do not know if the study underestimated or overestimated the final results. We can read between the lines of these results, but it will take a repeat of the protocol, and better statistics, to really ferret out ginger's effect on ulcerative colitis.

The authors concluded that this dose of ginger for 12 weeks benefited people with ulcerative colitis in some inflammatory parameters and clinical outcomes. They ascribed the lack of benefit in other variables because of inadequate dose and treatment duration. Alternatively, it also is possible that ginger does not actually work for this diagnosis regardless of the dose or time period. The structure of this study just does not permit us to comment definitively on the primary outcome, the SCCAIQ results, or any of the secondary variables detailed.

The results are interesting, though. If we believe the anti-inflammatory effect of the MDA test, it seems likely that the total serum antioxidant level also would have changed. A repeat of this examination, with stronger methodology, would be compelling. If ginger has such systemic effects, it truly might be useful for an inflamma-

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tory condition such as ulcerative colitis. In that line of thinking, the next study needs to more specifically detail the allopathic treatments being used in the study cohort that are more typical of inflammatory bowel disease, such as oral (or intravenous) steroids and topical/oral preventive medications.

Long-term use of ginger, if it bears out to be significantly anti-inflammatory, may have additive effects with those pharmaceuticals. And the heartburn and bloody diarrhea (although there also was one case of bloody diarrhea in the control group) could be considered adverse effects or simply ulcerative colitis pathology. Better tracking of adverse effects and plant-pharmaceutical interactions are imperative as clinicians attempt to learn a risk-benefit approach for using phytomedicinals.

In summary, there were some preliminary findings of both benefit and no difference for the use

of 2 g of ginger daily for 12 weeks vs. placebo in people with mild-to-moderate ulcerative colitis, specifically on symptoms and serum markers of inflammation and oxidation.

Ginger is a culinary spice and plant with a long history of use for a variety of conditions (mostly gastrointestinal). For this reason, providers could consider using ginger in therapeutic doses (provided there are no pharmaceutical interactions) for people with ulcerative colitis until more methodologically sound research corroborates or disproves the findings of this study. ■

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CME QUESTIONS

- Based on the results of a systematic review and meta-analysis by de Souto Barreto et al, which of the following exercise regimens was found to have the most overall benefit in reducing the risk of falls and injurious falls in older adults?
 - Vigorous-intensity exercise, four times weekly
 - Moderate-intensity exercise, two to three times weekly
 - Moderate-intensity exercise, fewer than two times weekly
 - Moderate-intensity exercise, more than four times weekly
- Which of the following is true regarding the use of ginger for people with mild-to-moderate ulcerative colitis?
 - All symptoms parameters, as per two questionnaires, improved as soon as the six-week mark.
 - This study used 250 milligrams twice daily, considered a very high dose.
 - At 12 weeks, the ginger group showed a lower (improved) Simple Clinical Colitis Activity Index Questionnaire score for disease severity when compared to the placebo group.
 - Serum antioxidant testing revealed markedly higher inflammation in the ginger group compared to the placebo group.
- In the randomized, controlled trial involving Cognitively Based Compassion Therapy, which of the following is true?
 - This intervention, which is based on mindfulness, was administered to parents in a group setting over eight to 10 weeks and found to be associated with a decrease in a measure of stress in children of the parents (hair cortisol concentration).
 - This intervention, which is based on behavioral interventions, was administered to children and parents during family therapy during a period of eight to 10 weeks and found to decrease stress in both groups.
 - This intervention, which is based on mindfulness, was administered to parents in a group setting over eight to 10 weeks and found to decrease parental stress as measured by standard questionnaires.
 - This intervention, which is based on behavioral interventions, was administered to children and parents during family therapy over eight to 10 weeks and found to be associated with a measure of mild improvement in specific child behaviors and a decrease in a measure of stress in children (hair cortisol concentration).

[IN FUTURE ISSUES]

Step Count,
Step Intensity,
and Mortality

Dietary Patterns
and Subclinical
Cardiac Injury

Acupuncture During
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