DOWNLOAD PDF THE COMPARATIVE EFFECTS OF TWO LEVELS OF TRAINING INTENSITY ON HUMAN ADAPTATION TO A STATE OF STRESS

Chapter 1 : Can People with Diabetes Take Fat Burners and Weight Loss Pills? â€“ Diabetes Daily

The comparative effects of two levels of training intensity on human adaptation to a state of stress. of training intensity on human adaptation to a state of stress.

Luiz Guilherme Antonacci Guglielmo [luiz. Comparative effects of two interval shuttle-run training modes on physiological and performance adaptations in female professional futsal players Submission type: Original Investigation Running head: Improving aerobic and anaerobic performance in female futsal players Text-Only Word Count: De Lucas1, Lorival J. TE Conflicts of interest: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript. Sixteen players competing in the Brazilian National Division League took part in the study. The training protocols consisted of shuttle-run intervals organized in four sets of 4-min bouts with 3-min of rest intervals between the sets. The SRIT models were composed of one 7. The athletes performed the following tests before and after a 5-week training period: After the training period, PSFIET and speed at the second lactate turnpoint were very likely and almost certainly increased in both training regimens, respectively. In elite female futsal players, SRIT15x15 is a promising strategy to enhance performance-related physical fitness attributes in a short-term period 5 weeks during the preseason, due to its superior effects on these important aerobic and anaerobic qualities than a protocol with fewer directional changes. Team sports; change of direction; training adaptation; court sports. Due to court dimensions 40 x 20 m , unlimited number of substitutions and frequent attacking D and defensive tasks, futsal players are required to perform high-intensity locomotor activities such as sprints, accelerations, decelerations and changes of directions with a high demand placed TE on both the aerobic and anaerobic metabolic systems 4, Thus, in addition to other physical qualities e. Considering the aforementioned aspects, there are several training strategies being used to focus on the simultaneous development of cardiorespiratory fitness and RSA in team-sport athletes 9,12,20, In this regard, the repeated sprint RS -based running and high-intensity interval training HIIT have been widely used in physical conditioning programs of soccer 10,20,31,50 C and futsal players The RS-based training are characterized by multiple sprints interspersed with brief recovery periods 20 , whereas HIIT consists of repeated bouts of longer exercise A intervals performed at intensities close to the maximal aerobic speed MAS , interspersed with equally longer active or passive recovery periods 7. In theory, both training methods can be considered as interesting strategies for improving the physical attributes essential to futsal during a relatively short period of time e. However, it was shown that RS training added to regular futsal training did not optimize RSA adaptations in professional male players This finding was recently confirmed in junior male soccer players Interestingly, Buchheit et al. The effectiveness of supramaximal HIIT needs to be tested in other athletic groups, such as female futsal players, who have been overlooked in the scientific literature It is important to note that female athletes D can respond differently to male counterparts when using the same exercise stimulus Additionally, more attention needs to be addressed to some specific features of the protocols TE used for HIIT prescription, with special focus on the number of changes of direction during the running bouts 27, From a practical perspective, the inclusion of pre-planned high-intensity shutte-runs i. In a more recent study, it was demonstrated that increasing the frequency of directional changes 9 vs. Combining together, these results suggest that the altered the frequency in the changes of direction during HIIT protocols can be mechanically and physiologically appropriate to induce specific adaptations 1, Although the content in the literature shows a greater acute physiological stress in shuttlerun drills 1,6,8,18,21,25 , Da Silva et al. Nevertheless, Guglielmo et al. However, until now, the longitudinal effects of different SRIT one vs. From a practical point of view, it is important to determine whether the inclusion of more directional changes during SRIT will elicit greater training effects on variables derived from laboratory e. D Experimental Approach to the Problem TE Changes of direction during running induce greater acute metabolic, perceptual, neuromuscular and physiological responses 1,6,8,18,21, A parallel two-group, matched-work, longitudinal experimental design was used in

order to compare the changes in the physiological and performance adaptations induced by two different protocols of shuttle-running interval training C EP SRIT in female futsal athletes. Players were randomly assigned to either a group comprising one directional change 7. Players within each group were equally matched according to their baseline performance on Futsal Intermittent Endurance Test FIET , C assuring that both groups displayed equivalent pre-training mean values for each of the physiological and performance parameters. The performance tests were carried out on 3 different A days, 1 week prior to the commencement of training and 1 week following the 5-week training intervention program. These performance tests were carried out in a laboratory and on an indoor futsal court. Players were familiarized with the exercise procedures prior to commencement of this study i. A schematic representation of the study is depicted in Figure 1. D Subjects TE The sample size was estimated using acceptable precision or confidence intervals CI a priori using the approach developed for magnitude-based inferences Based on the assumption that a between-group difference in intermittent endurance running capacity of 6. Twenty young female outfield futsal players belonging to the same professional team competing in the Brazilian National Division League were originally recruited to participate in this study. At the time of study, all the players had at least 3 years experience 4. The inclusion criteria for the study were: During the training period, 3 players were injured and 1 player moved to another team, so results from only 16 players All players signed an informed consent form, and all procedures in this investigation were conducted in accordance with the Declaration of Helsinki and approved by the local research Ethics Committee protocol All players under 18 years of age had written informed consent from a parent or guardian to participate in the present study. D Participation was voluntary and players could withdraw at any time. Experimental Design Procedures C EP In order to assess the changes in performance induced by two different protocols of shuttle-run interval training SRIT , a parallel two-group, matched-work, longitudinal experimental design was used. The whole study period was conducted within seven weeks, which included a 5-week training period. Training was implemented during the preseason phase March and April in addition to a regular futsal training schedule proposed by coaches and trainers. During the 5- C week training period, players completed a total of 35 training sessions, which were organized into 10 sessions devoted to the aerobic training regimens experimentally implemented for the A purposes of this study, 5 sessions to develop strength-power characteristics, 17 sessions dedicated to futsal-specific technical-tactical skills and 3 friendly matches. To ensure that both groups presented similar pre-training average values for each performance variable, the players were pair-matched based on their baseline performance on Futsal Intermittent Endurance Test FIET and randomly assigned to either the SRIT7. These physical fitness tests were carried out in a laboratory and on an indoor futsal court. Players were familiar with the testing procedures as part of their usual fitness assessment program. Players recovered for at least 48 hours between each testing session to minimize any residual fatigue. They were also told to maintain their usual diet throughout the C study and to consume their last meal with no caffeine ingestion at least 3 hours before the beginning of the testing session. Participants were allowed to drink water ad libitum during the A field testing and training sessions. The TE main difference between the two training protocols was the duration of the exercise and rest, with one comprising 7. The intensity used for the SRIT7. This difference was set to account for the time necessary to perform each change of direction 14 , which occurred 3 times more in the SRIT15x15 compared to the SRIT7. The average running pace performed by the athletes between the start and return lines for each training protocol was dictated by a prerecorded audio cue, emitting beeps every 3. Throughout the training period, the external load i. In that situation, the distance was increased by 1 meter, which corresponds to a 0. It is important to highlight that during the 10th training session the external load i. In addition to HR measurements, the internal training load was monitored for each participant by recording the training duration multiplied by the RPE score session-RPE Figure TE Physiological measures and physical performance D 2b An intermittent incremental exercise test was performed on a motorized treadmill Imbramed Millennium Super, Porto Alegre, Brazil. The second lactate turnpoint LT2 C was determined according to the procedures put forth by Berg et al. Each participant was verbally encouraged to A deliver

maximum effort during the incremental test. Respiratory gases were measured breath by breath during the incremental test using a calibrated online metabolic system Quark; COSMED, Rome, Italy , and the data were reduced to s averages. The speed was controlled by prerecorded audio cues. Every 45 m, participants were allowed to actively rest for 10 s. After each 8 x 45 m bout, players passively rested for 30 s before continuing. After 9 x m bouts, the increment is shifted to 0. The test was finished when participants did TE not reach the front line in time with beeps for 2 successive repetitions objective criteria. The athlete started 0. Following each sprint, athletes decelerated and walked to the starting line in readiness for the subsequent sprint. Five seconds prior to the next sprint, the athletes assumed the starting position and a 3 s countdown was provided to commence again. The percent sprint decrement RSAdecrement was calculated as follows: When assumptions were violated, log-transformations were performed. SRIT15x15 and one within factor time; pretraining vs. When a significant F value was identified, a Bonferroni post hoc test was performed to identify pairwise differences. Furthermore, an analysis of covariance ANCOVA was computed for change scores from pre- to post-training for both interventions C with the pre-test values inserted as covariates. In A addition to the null-hypothesis test, to allow for a better interpretation of the results, a magnitude-based-inference analysis was also used to examine meaningful differences. The criteria to interpret the magnitude of the ES were:

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This study compared the effects of these stress management strategies on personal and relational health. Two hundred and fifty-one dating individuals focused on a stressor that was a current source of rumination. Disclosure is also thought to be central to building and maintaining healthy relationships. Writing about stressful events has been found to have similar health effects to disclosure, including enhanced immune functioning e. Yet, little research has examined the comparative effects of talking, writing, and avoiding discussions about stress on personal and relational health. The current study addresses this void in the literature. In addition, the impact of those communication strategies on romantic relationships over time is examined. Unearthing the predictive power of these communicative stress responses could provide important practical information for how people can best manage their stress in close relationships. Rather than studying disclosure, avoidance, and writing about stress in isolation, greater insight can be gleaned by examining their relative contributions in a single study. Openness is generally viewed as optimal in healthy relationships, with intimacy and disclosure promoting mental health and relationship quality Parks, Disclosure tends to reduce distress and enhance behavioral and psychological outcomes Pennebaker, Much of the literature on disclosure suggests that people feel better after they self-disclose because it is cathartic. For instance, research on the fever model Stiles, ; Stiles et al. Talking or writing about stressful experiences is also associated with decreased physical illness Smyth, According to Pennebaker , , writing and talking about stress is health promoting because actively suppressing thoughts and behaviors increases anxiety and stress and provides a pathway to disease. Suppressing thoughts and feelings is believed to foster intrusive and obsessive thoughts, leading to illness Pennebaker, , Niederhoffer and Pennebaker explain that writing about stressful events is beneficial because it relieves some of the stress and effort used to suppress thoughts and emotions. Disclosing stressful experiences through writing is associated with numerous health benefits, including fewer medical visits Richards et al. Complicating the benefits of disclosure: Verbal rumination and the support provider There is no doubt that the disclosure of stress, whether expressed verbally or through writing, can be advantageous for personal and relational health. But is disclosure always beneficial? Pennebaker argues that disclosure is beneficial despite potentially negative reactions from a confidant, largely because it is cathartic and reduces cognitive rumination. Larger and better-quality social support networks provide an outlet for people to talk about their stress and receive assistance in managing it. There is also a main effect for social support. When people have effective social support skills and are embedded within social support networks, they naturally experience less stress because they have learned to manage it. Emotional support involves communicating in ways that show caring, comfort, understanding, empathy, and interest Burleson, Research shows that receiving high-quality emotional support reduces distress Pennix et al. Sometimes people have good reasons to withhold information from others. People are not always supportive when someone cannot stop talking about a problem Stroebe et al. The disclosures can promote emotional closeness in friendships, but often fuel anxiety because of the preoccupation with negative emotions Rose, An important question that remains relatively unanswered is how to help people stop cognitively brooding. If people can reduce their cognitive brooding, their verbal rumination should also subside. Cognitive brooding or depressive rumination is debilitating because people become passively immersed in negative affect and depressive thoughts about their problems, and focus repetitively on barriers to overcoming them Nolen-Hoeksema, Unfortunately, brooding is consistently associated with poor mental health symptoms, such as anxiety and depression e. One possible solution to brooding might reside with the social support received when verbally ruminating. To test the role of support and rumination, Afifi et al. When individuals received poor support when they were talking about their stress with their friend, they were more anxious and dissatisfied with the friendship afterward.

When individuals received good support, it enhanced their satisfaction with the friendship, but did not reduce their anxiety. Consequently, the level of emotional support may influence anxiety and how people feel about their relationship, but why was there no significant effect on brooding? A possible explanation is that the laboratory setting and manipulation of social support lacked external validity. A longitudinal, naturalistic design may be necessary to capture more long-term effects of social support on brooding. Romantic relationships may also provide a more optimal context for verbal rumination than friendship because of increased levels of intimacy in romantic relationships. Romantic partners may also be more likely than friends to communicate their honest feelings of disapproval when their partner is verbally ruminating. Emotional support, however, might also need to be provided in such a way that the person who is verbally ruminating can positively reappraise the stressor rather than reappraise it in a neutral way. Nevertheless, cognitively reappraising the stressor in a neutral way rather than in a positive way did not have the same effect. Therefore, in order to diminish brooding, the person who is brooding might need to perceive the stressor in a new, more positive way rather than simply thinking about it differently. Positively reappraising a stressor may allow for meaning making to occur, as well as enable people to stop the cycle of negative affect by replacing negative emotions with positive ones. This sense-making and shifting of emotions can happen with disclosure or writing, but it might be facilitated by a social support provider who can offer assistance with the process. Pennebaker describes that making sense of distressing situations either cognitively or linguistically is a key part in recovering from them. When greater meaning is made of events, people are likely to incorporate these new insights into their world view Horowitz, There is also evidence that distractive coping where people are trained not think about their problems as much helps them stop brooding e. In this sense, avoidance might provide an important escape for some people from constantly thinking about their stressors and, subsequently, improve anxiety, brooding, and relationship quality. But, what is unknown is whether one method is more or less effective than another. With this information in mind, the following research question and hypothesis are set forth: Within the verbal condition, the impact of talking about the stressor on a relational quality, b anxiety, and c brooding will be moderated by the emotional support received during the conversation and the ability to reframe the stressor in a positive manner after the conversation. Method Participants Two hundred fifty-one dating individuals participated in this study. The average age of the participants was The participants had been dating their partners an average of Many of the participants were in long-distance relationships n.

Chapter 3 : Comparative effects of two interval shuttle-run training - www.nxgvision.com

The third and final training block was similar to training block two; however, the training intensity was set at 90% 1RM at a work range of two to four repetitions. All training sessions were separated by a minimum of 48 h and consisted of min of exercise.

Do strong abs, greatly shaped glutes for the ladies , and well-shaped pecs and arms for the guys sound appealing? Of course, they do. Which is interesting, because out of the two goals, is getting leaner harder than gaining weight and putting on size? If your goal is to get leaner, would it be fair for me to say that you want to get results as fast as possible? Question is, can they? From a physiological standpoint, what this means is actually a few different processes. Different compounds could do this directly by acting on a fat cell to increase the release of stored fat, or, indirectly, through increasing metabolic or hormonal activity leading to greater heat generation or fat utilisation 1. But are they even effective and can fat burners really help you to goal of summer shreds? Other common compounds in many other products include green tea catechins, in particular EGCG, and bitter orange extract. A lot of stimulation at that. And what kind of impact could they have on diabetic control? As the main fat burning compounds in use, this article is going to keep the focus on caffeine, EGCG, yohimbine, bitter orange, green coffee extract, and forskolin. Scheduled compounds, like clenbuterol or ephedrine, will also be discussed. The first thing to separate out is the type. Most of the research shows that the most potent green tea catechin is epigallocatechingallate, or EGCG, and lower doses of EGCG have been shown to increase fat burning than total green tea catechins 3; 4. In fact, the total EGCG content within an overall dose of green tea catechins is what you want to look out for. For example, one study comparing mg of EGCG used divided doses of mg throughout the day, and the increase in fat burning observed was not significant 2. There are two points to bear in mind from the above studies. The first is mentioning the training status of the subjects. Basically, the increases in fat burning noted in these studies could reflect an adaptation to aerobic training 4; 6. They got fitter and better at burning fat. Now, why might this be important? Because it appears that the beneficial effects of EGCG are specifically related to its interactions with caffeine. While green tea naturally contains caffeine, it is nowhere near the doses seen with coffee or energy drinks. For example, combining doses of mg, mg, mg, and 1, mg EGCG together with mg caffeine resulted in no effect on fat oxidation 8. You could go drowning yourself in green tea every day, to the tune of up to 8 cups, to get the desired dose: Caffeine has repeatedly been shown in research to increase sympathetic nervous system activity, boost resting metabolic rate, increase adrenaline output, and increase fat mobilization 1; However, note two things about those effects of caffeine. First, they primarily relate to enhanced physical performance, particularly central nervous system drive and adrenaline output. In fact, the distinct performance-enhancing and fat-mobilizing effects of caffeine have never been concretely linked to increased fat burning For example, a study using doses of mg, mg or mg caffeine found an increase in metabolic rate and in fat breakdown, but measurements of energy expenditure in the subjects showed that the increase in energy burning came from equal oxidation of carbohydrate and fat One issue with caffeine in studies may be the timing of intake. For example, in the latter two studies caffeine was given minutes before testing 10; Another variable you may have noticed thus far is the use of a set VO2max in studies. Why could this be an issue? Well, if a specific percentage of VO2max is used, it may not, in fact, be a uniform intensity for the intervention group due to differences in fitness levels â€” different subjects may have different thresholds for exercise intensity Using lactate threshold to define intensity may be more effective, as this is the threshold where aerobic energy systems relying in fat metabolism are operating at their max capacity, and beyond that we shift into anaerobic metabolism and carbohydrate oxidation Ultimately, caffeine is not the fat burner many think it is and requires higher doses to achieve an effect: It appears that caffeine is best used at higher doses and during submaximal aerobic intensities. There are also implications for tolerance, and increasing dosage does not overcome tolerance to caffeine. Yohimbine Yohimbine is similar to caffeine in that

it is a plant alkaloid, occurring naturally in a particular species of tree. Yohimbine is a compound that acts both directly and indirectly to influence fat oxidation. In its direct effects, yohimbine acts on receptors on fat cells that normally act to suppress fat oxidation and inactivates those receptors In doing so, it allows fat to continue to be oxidized without suppressing those mechanisms. It also has an indirect effect, similar to caffeine, through increasing adrenaline levels, and adrenaline itself stimulates fat mobilization and oxidation Yohimbine is popular because the fat cells that it acts on both directly and indirectly through adrenaline are particularly concentrated in the thigh are in women and belly in men, i. However, a word of caution: Another issue is that there appears to be significant issues around labelling accuracy on supplements, and wide variability in the precise dose contained in a given product All in all, while effective, yohimbine simply comes with too much baggage. It increases adrenaline and dopamine system activity, thereby increasing fat breakdown and metabolic rate The human research is thus far overall positive. One trial supplementing For the physique-enthusiasts amongst us, we should cross our collective fingers in the hopes of further research into this promising supplement. Mechanistically, high levels of forskolin can increase the breakdown of fat from storage, however, the doses used to show this effect have not been replicated in humans The human research is relatively limited to date. So, there are a few caveats to the research to date. First, overweight and obese persons have lower levels of cAMP, and thus the effects of forskolin supplementation may be more pronounced in these populations Secondly, the effects of increased testosterone may underscore the fat burning effect, as distinct from any direct fat burning effect of forskolin itself, an observation somewhat supported by the difference in the study in women [no significant effect] compared to the study in men [significant effect]. And it may have caution in diabetics, for reasons explained below. Green Coffee Extract Green coffee extract is extracted from unroasted green coffee beans, as the compounds are largely lost in the process of roasting coffee beans Green coffee extract is touted as a fat burning compound but we can be relatively brief with this: A recent meta-analysis confirmed this While there was an overall weight loss effect noted, the trials did not specify dosage used, and had significant methodological limitations which cast doubt on the results Two authors of one study were also affiliated with a company selling a GCE weight loss product Aside from the methodological limitations of the studies on GCE to date, the results themselves are of questioning clinical relevance Ephedrine acts by both directly stimulating the production of heat in muscle cells and by stimulating the breakdown of stored fat Combined together, ephedrine and caffeine show distinct fat burning synergy, due to the effect that the class of compound which caffeine is, a methylxanthine, boosts the ability of ephedrine to increase metabolic rate There have been significant concerns, however, raised over the use of ephedrine and ECA: So, is it worth it? Like most things, the dose makes the poison: So there are two caveats: So, yes it can be safe, and it is certainly effective, but may place an added burden on diabetes management. Clenbuterol leads to significant improvements in body composition not solely attributable to fat burning, but also to lean mass increases In the context of an energy deficit that is a prerequisite for fat loss, clen preserves lean mass while significantly increasing fat burning Clen enhances fat burning through the same mechanisms as yohimbine and ephedrine, stimulating fat oxidation It also does not appear to have any impact on blood glucose levels, however, insulin disrupts the signalling of compounds like clenbuterol to fat cells, so there is a potential interaction that could be relevant to timing of use of both insulin and clen 51 Potent fat burning compound, with the same caveats applying regarding legal status. If using, use wisely: For those that may be effective, we need to consider the potential interactions of these compounds with diabetes management. The main effect of caffeine is interfering with insulin action on glucose disposal, not impacting on insulin secretion itself which is unaffected by caffeine intake Timing caffeine use away from meals would be a good idea to avoid any interaction with post-prandial glucose metabolism. Consider ephedrine here too: Coffee intake is strongly associated with reduced risk of type 2 diabetes, an effect which is more attributable to other compounds in coffee as the protective effect is also observed with decaf Thus, while coffee intake is itself a beneficial food product, it remains inadvisable from a blood sugar management perspective to supplement with isolated caffeine, which will increase blood glucose as a result of impaired glucose disposal

32; Green tea catechins may, in fact, benefit diabetics, although it should be noted that the research is in type 2. A study in type 2 diabetics found mg of decaf green tea extract, of which mg EGCG, taken 3 times per day resulted in significant improvements in insulin sensitivity [measured via HOMA-IR], reduced insulin concentrations, and reductions in triglycerides over 16 weeks The effect on improved insulin sensitivity is not always observed in type 2 diabetics However, green tea catechins may improve blood glucose regulation. Green tea catechins have been shown to improve post-meal glycaemic control in pre-diabetics by inhibiting glucose uptake, without impacting on insulin secretion Brewed green tea may also increase glucose disposal and nutrient partitioning in monocytes over adipocytes, although this has yet to be demonstrated in humans Overall, supplementation with green tea catechins appears to be potentially favorable to diabetes management, without negatively impacting insulin secretion or action. There simply is no human evidence, but studies in cell cultures have shown that forskolin stimulates insulin release from pancreatic cells In this context, and without any human research, the advice here would be to err on the side of caution and opt against supplementation with forskolin: A similar position can be taken with yohimbine: This was in fact considered a positive, as insulin secretion is suppressed by mechanisms which are inhibited by yohimbine, thus supplementation was normalizing insulin function in diabetic rats Again, we have no human data on the potential interaction, and given the side-effects of yohimbine outweigh the efficacy, from a diabetic management perspective it is best to scratch this off the list. P-synephrine, on the other hand, does not appear to negatively impact on blood glucose management or insulin function. P-synephrine is considered to have a wide safety margin, and the lack of any observed effect on blood glucose taken with its observed increase in metabolic rate, suggest that this could be supplemented safely in diabetics. Clenbuterol may have an interaction with insulin, insofar as elevated insulin may suppress activity of the drug: Diabetic Muscle and Fitness Practical Application:

Chapter 4 : Effect of manual lymph drainage on removal of blood lactate after submaximal exercise

[Google Scholar]] reported decreased perceived stress levels among female nursing students after 6 weeks of exercise and meditation training; self-reported life changes, a proxy measure for life stress, increased for the aerobic exercise group, but decreased for the meditation group.

This article has been cited by other articles in PMC. Abstract [Purpose] It has been well-established that exercise-induced muscle damage occurs following intense exercise. Massage is commonly used to manage muscle damage resulting from exercise. However the effect of massage after exercise is still not clear. The purpose of this study was to examine the effect of manual lymph drainage on muscle damage and on the removal of blood lactate following submaximal exercise SE , as part of a solution to the challenging problem in sports medicine of muscular recovery after exercise. Seven days later, all subjects were made to run for 30 minutes on the same treadmill ergometer, at a running speed equivalent to the IAT. One group received MLD treatment, while the control subjects received no treatment. The course of creatine kinase CK and myoglobin levels was comparable, and with myoglobin showing a significant difference at 2 h after SE, and CK at 24 h after SE. This damage includes a series of events occurring. It causes damage to the sarcolemma and the muscle cell membrane. This damage results in the release of biochemical markers of muscle damage including e. Coaches, athletic trainers, and athletes should seek scientific support for therapeutic interventions which claim to help reduce the effects of muscle damage and speed of recovery from exercise and athletic endeavors 2. Therefore, improving muscle recovery after physical exercise is an important topic in sports medicine. Many researchers investigated various intervention to treat muscle damage such as active recovery, massage, cryotherapy, electrotherapy, hydrotherapy, supplementation and compression garments 3 , 4 , 5 , 6 , 7 , 8 , 9 , Massage is also commonly assumed to enhance muscle recovery from intense exercise However the effect of massage after delayed onset muscle soreness DOMS is still not clear The potential benefits of massage on recovery include increased blood circulation and venous return, greater lactate clearance, decreased pain sensation, and general well-being Manual Lymph Drainage MLD is a massage technique that involves the skin surface only and follows the anatomic lymphatic pathways of the body. Unlike other types of massage, it produces neither blush nor pain and promotes lymph flow 14 , Creatine kinase, a dimeric enzyme with a particularly large molecule 80, Da cannot penetrate enter into the bloodstream following muscular injury. And under injury conditions, it passes into the lymphatic system from the intercellular fluid and is transferred to the general circulation from the thoracic lymph nodes. This has led to the hypothesis of an inverse relationship between lymphatic circulation and CK levels They concluded that physical inactivity of short duration reduces the lymphatic transport of CK and the secretion of muscle enzymes Currently, there is a lack of controlled research to support the efficacy of manual lymph massage in accelerating the rate of post-exercise blood clearance of lactate and biochemical markers such as CK, LDH, and AST Although acute submaximal exercise SE may induce tissue damage in trained individuals, MLD applied immediately after exercise can reduce tissue or muscle damage and also help the removal of blood lactate. In this study, we have investigated the effect of MLD on reducing tissue or muscle damage and removing blood lactate and muscle enzymes after SE in moderately trained individuals was investigated. The subjects were randomly divided into two groups, an MLD group and a control group. They are illustrated in Fig. None of the subjects had any history of cardiovascular, metabolic or musculoskeletal injury, or disease. All the subjects gave their informed consent before the study started. Subjects were instructed to avoid heavy exercise in the 72 hours before coming on all occasions. The physical characteristics of the subjects are shown in Table 1.