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HEART RATE AND CORE TEMPERATURE RESPONSES DURING BASIC YOGA COMPARED TO HOT YOGA

A Manuscript Style Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Clinical Exercise Physiology

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HEART RATE AND CORE TEMPERATURE RESPONSES DURING BASIC YOGA COMPARED TO HOT YOGA

By Ashley N. Nereng

We recommend acceptance of this thesis in partial fulfillment of the candidate's requirements for the degree Master of Science, Clinical Exercise Physiology.

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ABSTRACT

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This study was designed to examine the differences in heart rate and core temperature between hot yoga and basic yoga classes. Twenty subjects (4 males, 16 females) performed a VO_2max test using the Bruce protocol. Additionally, subjects completed a 60 minute basic yoga class and a 60 minute hot yoga class using identical poses. Both classes were taught by the same instructor. Each yoga class consisted of a 5-minute warm-up, a 40-minute exercise session, and a 10-minute cool-down. During the yoga sessions core temperature was measured at the beginning of the class, every 5 minutes during the class, and at the end of the class using a Cor Temp Ingestible Core Body Temperature Sensor. Heart rate was measured each minute of both yoga sessions by radiotelemetry. At the end of each yoga session, subjects rated their perceived effort using the 6-20 Borg scale. There was a significant difference in RPE, for the hot yoga class compared to the basic yoga class. There were no significant differences in heart rate or core temperature responses between yoga sessions. Based upon these results it appears that hot yoga does not result in unsafe core temperature or heart rate responses.

ACKNOWLEDGEMENT

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INTRODUCTION

Yoga dates back to 2500 B.C. as an ancient Indian practice (Tran, Holly, Lashbrook, & Amsterdam, 2001). Yoga focuses on the union of the mind and body. The key concepts underlying the practice of yoga include meditation, breathing, and focusing on centering the body's energy (La Forge, 2005). In the 1990's, the popularity of yoga grew rapidly throughout the United States and Europe as a mind-body exercise (La Forge, 2005).

There are many documented benefits of yoga. Yoga has been shown to improve strength, flexibility, maximal oxygen uptake (VO_2max), and body composition (Sanders, 2005; Tran et al., 2001). Yoga has also been shown to be a therapeutic alternative for treating chronic illness and life cycle changes for women (Chapman & Bredin, 2010; Raub, 2002).

There are many different styles of yoga that can be practiced. The most common yoga style is Hatha yoga. This is considered the most general style of yoga. It is slow-paced and focuses on proper stance, body alignment, posture, and breathing. Another style of yoga that is well known is Vinyase yoga, which focuses on breath-synchronized movements. This yoga style is integrated with a series of poses known as Sun Salutations. Other styles of yoga are very focused on certain principles. For instance, Ashtanga yoga is a fast-paced, intense yoga that involves constant movement. Iyengar yoga is the opposite of Ashtanga, and is focused on holding poses for a long time period while maintaining proper body alignment (Mackenzie, 2011).

One of the newest yoga styles is hot yoga. Hot yoga involves practicing Vinyase yoga in a room with temperatures ranging from 80 to 105º F (Murphy, 2011b). Hot yoga sometimes gets mistaken for Bikram yoga. The difference between hot yoga and Bikram yoga is that Bikram instructors need to be trained specifically in that discipline, while hot yoga instructors can be any instructor that was trained in the practice of any yoga style (Murphy, 2011a).

Hot yoga purportedly offers many physical and mental benefits. The most highlighted benefit of hot yoga is the ability to increase joint flexibility. The high temperatures allow participants to be able to increase the stretch in their muscles and go through a greater range of motion (ROM). Another reported benefit of hot yoga is the mental gains resulting from participating in a class (e.g., being able to push oneself outside the comfort zone and the ability to focus as sweat rolls down the body while holding a balanced pose) (Barnard, 2011; Mackenzie, 2011; MacQueen, 2012).

While there are many proponents of hot yoga, there are critics as well. One potential problem of practicing hot yoga is dehydration (Bryant, 2010; Peters, 2010). Because of the hot exercise environment, beginners may experience spells of dizziness, nausea, and might pass out during a class (Broad, 2012). Additionally, the ability to go through a greater ROM may put too much stress on a participant's joints. This increases the risk of overstretching, muscle damage, and possible nerve damage if the participant pushes themself too far (Broad, 2012; Thomas, 2009).

The biggest potential problem with hot yoga could be a dangerous increase in core temperature (Tc). Resting core temperature is normally regulated around 37˚C. The body is able to conserve or dissipate heat to the environment through thermolytic and

thermogenetic reflexes (Qatar, 2013). Thermoregulation of the body is challenging when the air temperature is higher than body temperature, as it is in a hot yoga studio (Bryant, 2012; Gonzalez-Alonso et al., 1998). Also, dissipation pathways are less effective in the hotter the environment due to the decrease in the thermal gradient (Qatar, 2013). This could lead to heat exhaustion or heat stroke, which are dangerous and life threatening conditions (Dienhart, 2006; Engels, Yarandi, & Davis, 2009).

The body's responses to hot yoga are currently unknown. To our knowledge, the effects of hot yoga on heart rate and core temperature have not been studied. Therefore, the purpose of this study was to compare the heart rate and core temperature responses of regular yoga to hot yoga.

METHODS

Subjects

Twenty apparently healthy volunteers between 18 to 45 years of age were recruited as subjects. The subjects completed the Physical Activity Readiness Questionnaire (PARQ) prior to being enrolled in the study (Appendix A). The PARQ is designed to screen for medical conditions which may preclude subjects from safely exercising. All subjects provided written informed consent before undergoing any testing procedures (Appendix B). The study protocol was approved by the University of Wisconsin-La Crosse Institutional Review Board for the Protection of Human Subjects.

Procedures

Initially, all subjects completed a treadmill VO_2max test. The test was conducted using the Bruce protocol and subjects exercised to volitional exhaustion. During the test, heart rate (HR) was recorded each minute using a Polar HR monitor (Polar Elector Inc., Woodbury, NY). Oxygen consumption was measured continuously with a Moxus Metabolic System (AEI Technology, Naperville, IL). Ratings of perceived exertion were assessed at the end of each stage and at maximal exertion using the 6-20 Borg scale (Borg, 1973).

The second part of the study took place at The Body and Sol Yoga Studio in Onalaska, Wisconsin. Subjects participated in a 60-minute basic yoga class which is regularly offered at the studio. Prior to the class, subjects swallowed a Cor Temp Ingestible Core Body Temperature Sensor (HQ, Inc., Palmetto, FL) in order to monitor

core temperature (Tc). Subjects swallowed the pill 3 hours prior to the exercise session. During the exercise class, each participant also wore a Polar HR monitor. Tc was recorded 5 minutes prior to exercise, every 5 minutes during the yoga class, and 5 minutes after the session. HR was recorded each minute during the class. Session RPE was recorded at the end of the class. Within 24 hours, subjects participated in a 60-minute hot yoga class offered at the studio. Core temperature, HR, and RPE was measured in an identical fashion as during the basic yoga class. Both the basic yoga and hot yoga classes were taught by the same instructor and were designed to use an identical series of poses. During both classes room temperature was determined using a standard room thermometer and humidity was measured using a sling psychrometer at the beginning of the class, 30 minutes into the class, and at end of class.

STATISICAL ANALYSIS

Differences in HR, Tc, and RPE between the basic yoga and hot yoga classes acrosse time were assessed using repeated measures ANOVA. If there was a significant F ratio, pairwise comparisons were made using Tukey's post-hoc tests. Alpha was set at $p<0.05$ to achieve statistical significance for all analyses. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS, Version 19; SPSS Inc., Chicago, IL.)

RESULTS

Twenty apparently healthy men (4) and women (16) between 19-44 years of age completed the study. Descriptive characteristics of the subjects are presented in Table 1. The study consisted of completing a basic yoga session followed by a hot yoga session within 24 hours. Average values for room temperature, humidity, exercise HR, Tc, and RPE for both sessions are presented in Table 2. HR and Tc responses are also graphically presented in Figure 1 and 2. There were no differences between the physiological responses of men and women to the yoga sessions, thus group data is presented. Room temperature was approximately 22° F higher for the hot yoga session compared to the basic yoga session. The humidity was also significantly higher during the hot yoga compared to the basic yoga class. There were no significant differences between the yoga sessions for average HR or average Tc. There was a significant difference in RPE between yoga sessions, with the hot yoga session perceived to be more difficult.

Table 1. Descriptive characteristics of the subjects

	Female	Male
Age (years)	24.4 ± 5.35	31.5 ± 11.12
Height (cm)	168.8 ± 8.35	450.2 ± 25.43
Weight (kg)	67.3 ± 11.62	80.4 ± 4.54
HRmax (bpm)	183 ± 6.1	186 ± 3.8
VO_2max (ml/kg/min)	44.9 ± 6.15	55.0 ± 5.41

Values represent mean ± standard deviation.

Table 2. Data collected during the basic yoga and hot yoga sessions

	Basic Yoga	Hot Yoga
Average Room Temperature (˚ F)	70.8 ± 3.44	92.7 ± 1.81*
Average Humidity (%)	32 ± 5.9	35 ± 2.0*
Average Workout HR (bpm)	103 ± 9.7	105 ± 9.0
% Maximal HR	56 ± 5.0	57 ± 5.6
Average Core Temperature (˚C)	37.4 ± 0.38	37.6 ± 0.32
Session RPE	12.3 ± 0.57	13.6 ± 0.50*

Values represent mean ± standard deviation.
*Significantly different than basic yoga session ($p<0.05$).

Figure 1. Average heart rate responses to the basic yoga and hot yoga classes

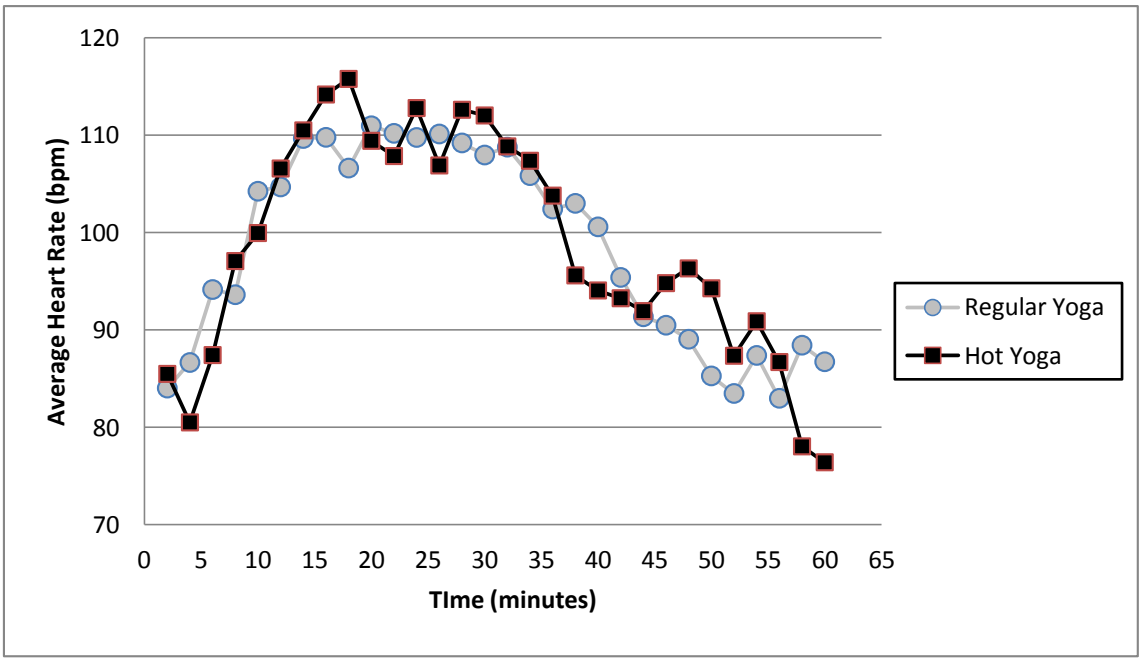
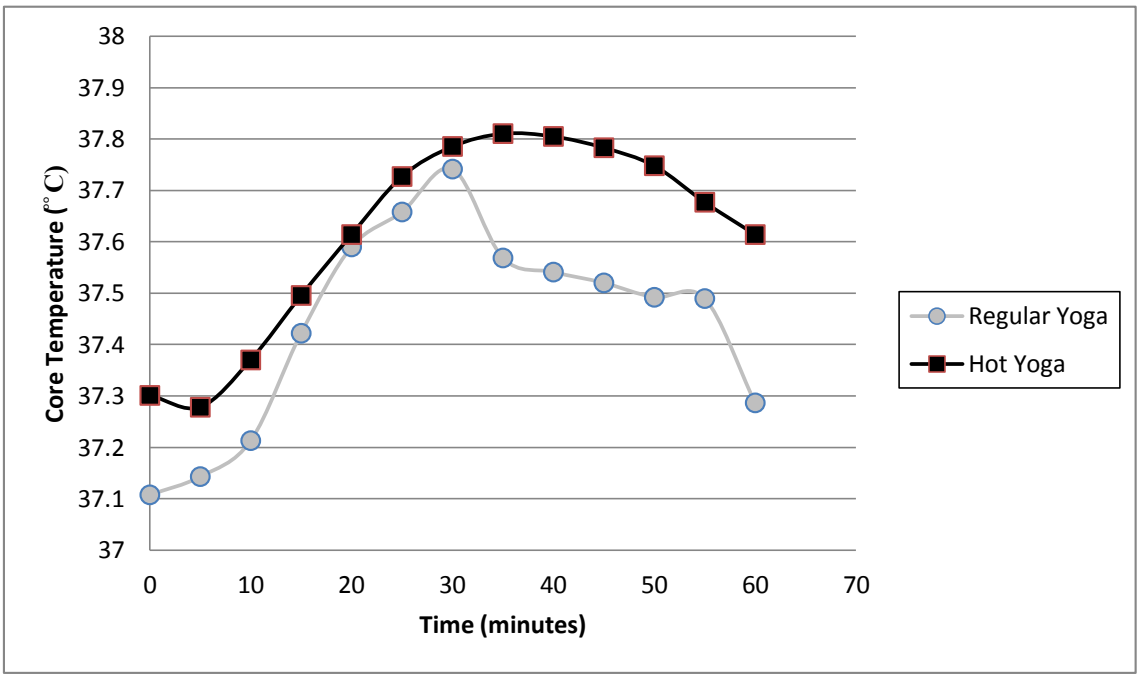


Figure 2. Core temperature responses for the basic yoga and hot yoga classes



DISCUSSION

One of the main concerns surrounding the practice of hot yoga is the potential adverse effects of exercising in an intentionally hot and humid environment. Hot yoga is generally practiced in a room that is between 90-105˚ F and humidity of approximately 40%. Many people feel that exercising in this type of environment will dangerously elevate core temperature, leading to heat-related injury. To our knowledge, no other studies have examined the physiological effects of hot yoga. In the present study, the hot yoga session was conducted in a room that averaged 92.7˚F and 35% humidity. We found no significant difference in the change in core temperature between the basic yoga and hot yoga sessions. Compared to resting values, core temperature increased by .6˚C for the basic yoga class and increased by .5˚C for the hot yoga class, respectively. In absolute terms, the highest temperature recorded for an individual was 39.1˚C (102.4˚F). This is well below the critical value of 40˚C (104˚F) which many people feel is the point where fatigue and heat-related problems are eminent.

There was also no significant difference in exercise heart rate between the two classes. Exercise intensity averaged 56% of maximal heart rate for the basic yoga class and 57% of maximal heart rate for the hot yoga class. This intensity would be classified a "light" exercise based upon American College of Sports Medicine guidelines (2010) for improving cardiorespiratory endurance. This finding is similar to the results of two previous studies that reported the intensity of yoga to be 62% and 57% of maximal HR, respectively (Anders, 2005; Clay, Lloyd, Walker, Sharp, & Pankey, 2005).

Even though the heart rate responses were similar between the basic yoga and hot yoga classes, subjects perceived the hot yoga session to be more difficult. Subject ranked the hot yoga session to be 1.3 RPE units higher than the basic class. Since the classes were identical in regards to the sequence of poses, the difference in perceived intensity had to be related to the higher heat and humidity.

It was interesting that even though perceived effort was higher, heart rate responses to the two sessions was the same, as was core temperature. This leads one to wonder if the subjects subconsciously down-regulated how hard they pushed themselves for some of the poses in order to compensate for the higher heat and humidity.

One possible limitation to the study could have been the overall room temperature and humidity were at the lower end of the ranges typically used for hot yoga. The recommended range of temperatures for hot yoga is from 90 to 105˚F, with a humidity of approximately 40%. It is possible that if the room temperature was in the upper part of the range, more exaggerated differences could have been found. However, anecdotally, the subjects in the present study said that it would be very difficult to exercise for the one hour class if the temperature and humidity were higher than what was used. Additionally, another hot yoga studio in town conducts classes with temperatures in the range of 85-95˚F and humidity within the range of 30-35%. Beginner classes start with a temperature of 85˚F and experienced classes start with a temperature of 95˚F. It should also be noted that humidity is not usually very tightly controlled, but rather is influenced by the number of people in the class and the size of the room. A bigger class in a small room elevates humidity to a greater degree than the opposite scenario.

In summary, it appears that the concerns related to abnormally high elevated core temperature during hot yoga classes is unwarranted, at least at the temperatures used in the current study. Further research should be conducted relative to the core temperature responses to classes conducted in the higher temperatures within the recommended range.

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APPENDIX A

PAR-Q

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- If you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

1:12

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APPENDIX B

INFORMED CONSENT

INFORMED CONSENT

Effect of Hot Yoga on Core Temperature and Heart Rate

I, _____, volunteer to participate in a research study being conducted at the University of Wisconsin-La Crosse.

Purpose and Procedure

- The purpose of this study is to determine the core temperature and heart rate responses during a Hot Yoga session.
- My participation in this study will involve two testing sessions, each lasting approximately 60 to 90 minutes.
- During the first session, I will have my aerobic capacity and maximal heart rate measured.
- During the second session, I will complete a 60 minute Basic Hot Yoga session.
- During the third session, I will complete a 60 minute Basic Yoga session.
- During the first session, I will wear a scuba type mouthpiece to monitor my breathing. During the second and third session, I will swallow an ingestible core temperature pill that will measure my core temperature response.
- During all testing sessions, I will wear a heart rate monitor around my upper body in order to record and measure my heart rate response.
- First session will take place in Human Performance Laboratory located in Mitchell Hall on the University of Wisconsin-La Crosse Campus. The second and third session will take place at Body and Sol located in East Towne Plaza, 9376 State Road / Hwy 16, Onalaska, Wisconsin 54650.
- Research assistants will be conducting the research under the direction of Dr. John Porcari, a Professor in the Department of Exercise and Sport Science.

Potential Risks

- Muscle fatigue, muscles soreness, and dizziness are possible risks associated with participating in this study.
- Individuals trained in CPR and Advanced Cardiac Life Support will be present for all testing sessions and the testing will be terminated if complications occur.
- The risk of serious or life-threatening complications, for healthy individuals, like myself, is <1:10,000 tests.

Benefits

- I will gain knowledge about my maximal heart rate and maximal aerobic capacity.
- I, and other participates, may benefit by gaining knowledge about the safety of Hot Yoga.

Rights and Confidentiality

- My participation is voluntary.
- I can withdraw from the study at any time, for any reason, without penalty.
- The results of this study may be published in the scientific literature or presented at professional meetings using group data only.
- All information will be kept confidential through the use of number codes and my data will not be linked with personally identifiable information.

I have read the information provided on this consent form. I have been informed of the purpose of this test, the procedures, and expectations of myself as well as the testers, and of the potential risks and benefits that may be associated with volunteering for this study. I have asked any and all questions that concerned me and received clear answers so as to fully understand all aspects of this study.

If I have any other questions that arise I may feel free to contact the principal investigator: Ashley Nereng (608) 864-0635, or her study advisor, Dr. John Porcari, 141 Mitchell Hall, (608) 785-8684. Questions regarding the protection of human subjects may be addressed to the University of Wisconsin-La Crosse Institutional Review Board for the Protection of Human Subjects at (608) 785-8124.

Participant: _____ Date_____

Investigator: _____ Date_____

APPENDIX C

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The purpose of this paper is to review the literature concerning the practice of basic yoga and hot yoga, in particular, focusing on the core temperature and heart rate responses in a heated environment.

Practice of Yoga

Yoga has added another component to everyday fitness programs because of its focus on the mind and body connection. Yoga offers a contrast to common aerobic exercise with the idea of focusing internally. A mind-body exercise focuses on meditation, proprioceptive awareness, and breath-centering, while maintaining spine alignment and energy focus (La Forge, 2005). A key point of yoga is the idea of mind over muscle. A participant's ability to stay focused throughout the poses and being able to maintain a degree of spirituality during the intensity and pace of poses determine the difficulty (Mackenzie, 2011). Most yoga studios now offer many different classes and modifications that allow everyone to practice yoga (Sanders, 2005).

Benefits of Yoga

Hatha yoga has been shown to improve strength, flexibility, and a variety of other general health factors (Sanders, 2005). A study by Tran, Holly, Lashbrook, & Amsterdam (2001) found improvements in flexibility, muscular strength and endurance and cardiorespiratory endurance after 8 weeks of yoga training. Yoga offers benefits to participants with a variety of ailments because it can be modified many different ways. Modifications offer the ability for different diagnosis of disease patients to be able to take part. There has been a link shown between body/mind focus on breathing and treatment for musculoskeletal disorders in the hands and wrists. A study by Greenfield (2009)

found improvements in pain threshold in participants with rheumatoid arthritis who followed a structured yoga program. The program reduced the need for medication and decreased the level of fatigue. Yoga therapy has been shown to improve shortness of breath and lung function in 15 patients with chronic bronchitis (Raub, 2002). Asthma is another lung disease that has shown improvement through the practice of yoga and breathing (Raub, 2002). Research in patients with cardiovascular disease (CVD) is very limited, but has shown risk factors of CVD to decrease with the practice of yoga (Raub, 2002). A study by Yang (2007) found that yoga is effective for lowering blood sugar, blood pressure, and cholesterol. The study found a reduction in fasting blood glucose (from 144 to 119 $mgdL^{-1}$) in people with Type 2 diabetes (Yang, 2007).

Hot Yoga

The origin of hot yoga can be traced back to Bikram Choudhury in the 1970s. He designed a 90-minute yoga session that is performed in a room where the temperature is between 80 to 105˚F and room humidity is approximately 40% (Murphy, 2011b). A normal yoga class is conducted in a room where temperature is approximately 70˚F and humidity is between 20-30%. The high temperature and humidity of the session is one of the most controversial aspects of hot yoga practice.

Hot Yoga versus Bikram Yoga

A high room temperature is a common factor between the practice of hot yoga and Bikram yoga. However, there are a few aspects that make a huge difference between the two. The first is the fact that all Bikram instructors must be certified in that specific yoga practice. The other major difference is the sequence of poses. In hot yoga, there is no specific pattern of poses that need to be followed, but in Bikram there is no variety in

sequence (Murphy, 2011a). Hot yoga is similar to Vinyasa yoga which involves flowing through a series of poses (Barnett, 2004).

Hot yoga is not for the competitive natured person, but for a person that wants to focus on their inner self. While focusing, the person must stay calm in a very stressful situation with the heat stress and the sweat. The most important aspect of a participant in a hot yoga session is the idea of listening to their own body through the signs of heat intolerance (Thomas, 2009).

Proposed Benefits of Hot Yoga

The benefits of hot yoga are based upon what the heat does to the muscles (Barnett, 2004). The heat allows participants to stretch through a greater range of motion and to increase sweating. Dancers have stated they feel like they are getting more benefit than an ordinary yoga session (Peters, 2010). Participants have stated that they have felt like they were overcoming their youth while remaining injury-free. While concentrating is an important aspect of regular yoga, it is harder in a hot environment and helps the participant reduce stress by becoming one with themselves (MacQueen, 2012). This leads to improved mental benefits. Participants have also shown improvement in blood pressure, stress and overall mood.

Concerns about Hot Yoga

There seem to be many benefits to hot yoga, but there are many concerns about its safety. When hot yoga first came out, the rooms were referred to as "torture chambers." Beginner participants may experience spells of dizziness, nausea, and may even pass out as a result of becoming dehydrated. Because the muscles are looser, the risk of overstretching may lead to muscle damage and dislocations which may lead to nerve

damage (Broad, 2012). Another concern is that the body may overheat, causing an unsafe rise in core temperature.

Body Response to Heat

The body's response to hot yoga is unknown. The body controls its temperature through thermoregulation. Thermoregulation is how the body regulates it's internal temperature in response to heat stress. The body has a hard time dealing with environmental temperature when a person exercises above an ambient temperature of 68˚ F (Galloway, 1997). As one exercises, the body cannot dissipate heat, thus core temperature rises which increases the risk of heat stress. A way of decreasing the risk is to make sure participants are adequately hydrated (Bryant, 2010). When the body is dehydrated, there is a decrease in the amount of time that it takes to become exhausted (Armstrong et al., 2003; Cheuvront, Carter, & Sawka, 2003; Fallowfield, Williams, Booth, Choo, & Growns, 1996; Sawka, 2000). Heat exhaustion (also known as exertional hyperthermia) occurs at a core temperature of 40˚C (104˚F) (Hummard & Armstrong, 1988; Knochel, 1989). This occurs during exercise when muscle-generated heat accumulates faster than the heat dissipates. Along with the increase in temperature, heat stress increases heart rate due to decreases in stroke volume that may occur due to dehydration. This may cause too much stress on a participant's heart (Gonzalez-Alonso et al. 1998).

Measurement of Core Temperature

Measuring core temperature has always been difficult. When trying to determine core temperature, the researcher needs to get accurate information without disrespecting the subject's privacy. An ingestible core temperature pill that a subject swallows has

shown a positive relationship between rectal temperature and the reading of the pill r=0.94 (Edwards, Waterhouse, Reilly, & Atkinson, 2002; Engels, Yarandi, & Davis, 2009). The core temp thermometer pill was designed for the use of NASA, but has now been used by NFL teams during the pre-season training. Teams are using it in the players that are at a higher risk of heat stroke (e.g., overweight lineman) and athletic trainers monitor the core temperature of the players throughout practice. This allows the athletic trainers to decrease the possibility of heat stroke while maintaining a safe environment for all the athletes (Dienhart, 2006).

Summary

In conclusion, there is a great need to examine the core temperature and heart rate response of hot yoga. Yoga has shown to be a very beneficial exercise, but the potential risks of hot yoga have not been explored. Now that there is an easier way to measure core temperature, the effect of hot yoga on core temperature can be examined safely and non-invasively.

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