Comparison of Heart Rate Intensity in Practice, Conditioning, and Games in NCAA Division I Women Basketball Players

Courtney D. Elliott, Casey L. Pederson, James R. Hutson, and Dustin P. Joubert

Human Performance Lab; Department of Kinesiology and Health Science; Stephen F. Austin State University; Nacogdoches, TX

Abstract

Background: An athlete's heart rate (HR) is an important variable in quantifying the intensity of exercise. Workouts that increase HR are an important stimulus for training adaptations and conditioning. At other times, workouts that do not overly stress the HR may be desired to allow for recovery. The principle of specificity emphasizes that athletes should train specific to the way they will need to perform in competition. Because of this, monitoring HR during training and competition can be a useful tool. While exercise intensity in endurance sports has been previously investigated, less is known regarding the HR response in team sports, particularly women's basketball. **Purpose:** Compare the average HR response to basketball training and competition in: 1) open gym 5 on 5 scrimmage, 2) an actual basketball game against a different opponent, and 3) conditioning session. **Methods:** We had an NCAA Division I women's basketball team wear heart rate monitors for open gym scrimmages, actual games, and conditioning practices. For the open gym sessions, the team scrimmaged against each other 5v5 for ~90 minutes and the average HR over 4 open gym sessions was determined. For the actual games against other opponents, the average HR response for the team was averaged over 3 games. The conditioning sessions consisted of repeated, intermittent short sprint efforts over the course of 30-60 minutes, and the average HR over 7 conditioning sessions was calculated. The data that was collected was added to a spreadsheet where we used it to find the team's average for both the scrimmages, games, and conditioning. **Results:** During open gym scrimmages and conditioning sessions the women had a higher heart rate average as a whole team compared to the games. The games had the lowest HR out of all three conditions that were collected.

	5v5 Open Gym	Conditioning	Games
%HR Max	75 ± 6%	74 ± 5%	63 ± 9%*

*p < .05

Conclusion: The 5v5 open gym scrimmages reflect the exercise intensity when all the players are playing similar minutes. The average intensity for the team during their conditioning sessions was similar to this, which would indicate that they are training at the specific intensities they need to condition for on court play. However, the average HR intensity for the team during games was lower because not all of the women would play the same amount of time or play at all during an actual game. For the starters on the basketball team or the players that play majority of the game, they should be able to stay in shape throughout the 4+ month season because their training stimulus is greater 2 days a week for games. However, for the players that barely play any minutes during the game, their training stimulus is limited to practices. The bench players should find a way to workout on the game-days they do not play to help them keep the HR up and maintain an adequate training stimulus to avoid deconditioning throughout the season.

Introduction

- Heart Rate (HR) is an important factor in quantifying the intensity of exercise.
- Increasing HR is an important stimulus for training adaptations.
- Athletes need to practice at the intensity level that is required in competition.
- Monitoring their HR can be a helpful tool for the athletes and coaches.
- The HR response in endurance sports has been investigated, but less is known about HR response during basketball practice and competition, particularly in female athletes.
- The purpose of the study was to compare the average HR to basketball training and competition by comparing open gym 5v5 scrimmages, actual basketball games, and conditioning practices.

Methods

- NCAA Division I women basketball team wore HR monitors throughout the year during practices and games.
- The average HR for the team for the following conditions were compared:
    1) Open Gym (n = 4): team scrimmaged 5v5 against each other for ~90 minutes
    2) Games (n = 3): team played against other opponents for full game
    3) Conditioning (n = 7): repeated short sprint efforts for about 30-60 minutes
- Comparisons between conditions were made by a one-way, repeated measures ANOVA.
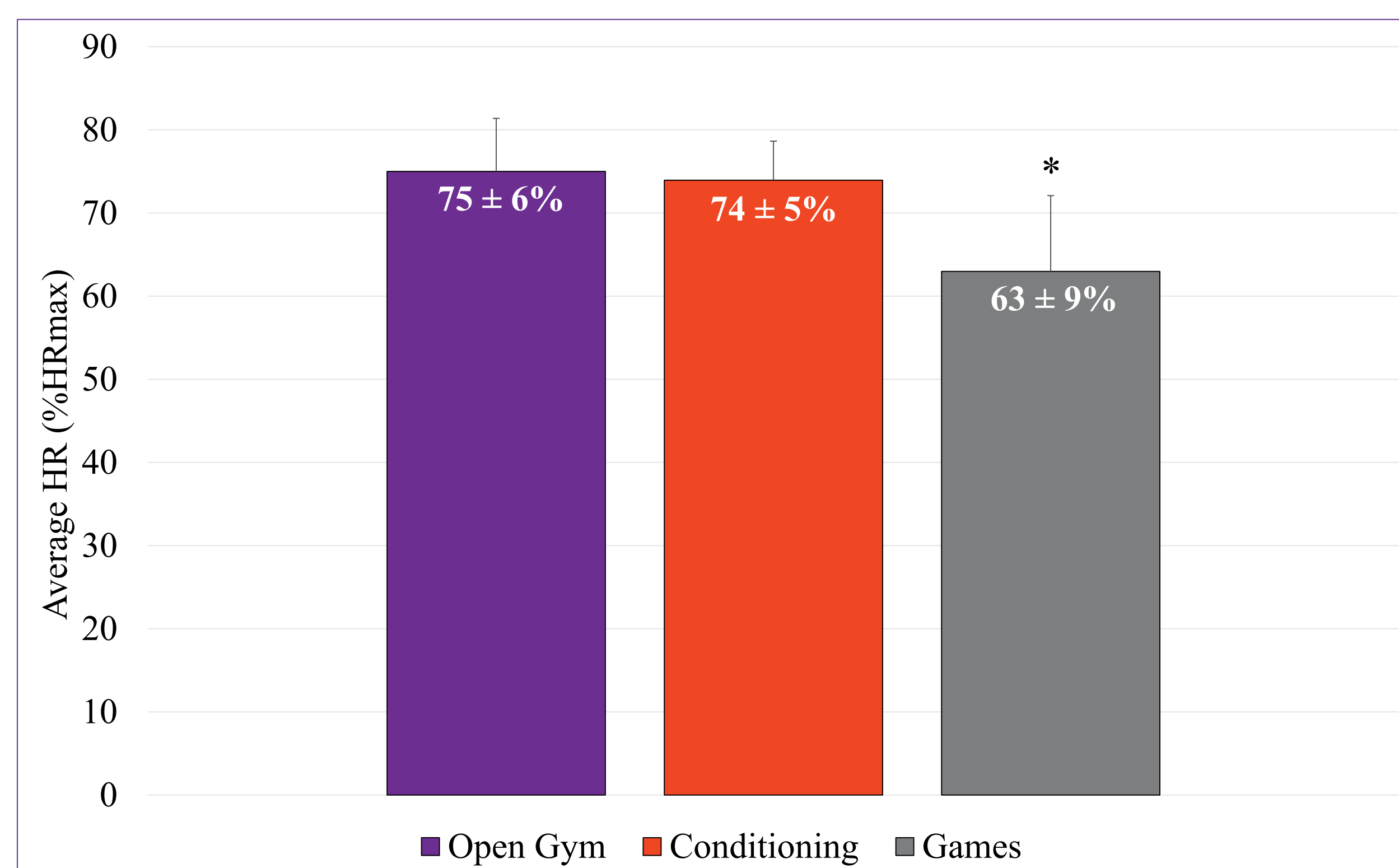

Polar Bluetooth Heart Rate Monitor

Polar Team App

Results

FIGURE 1 – Combined average heart rate for the whole team for the open gym, conditioning, and games. *p < 0.05.
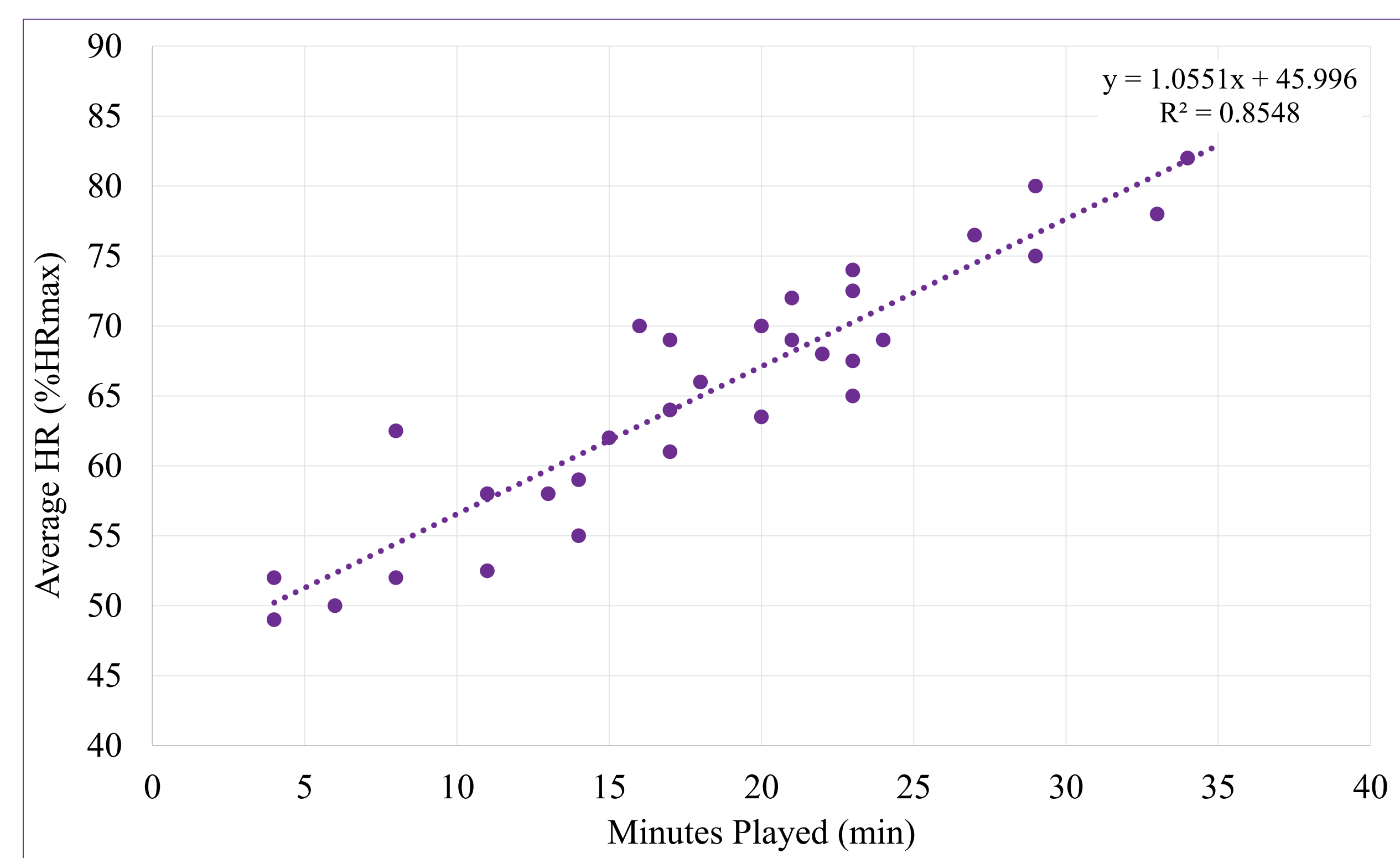

FIGURE 2- Average heart rate compared to minutes each player played in a game.

- Average HR for the team was lower for games than open gym and conditioning sessions (Fig. 1).
- There was a strong, positive correlation between a player's average HR and the minutes played during a game (Fig. 2).

Conclusions

- Open gym and conditioning sessions reflect the exercise intensity when all the players are playing the same amount of time.
- However, the average heart rate for the whole team during games was lower because not every player played the same amount of minutes.
- These data show that the athletes that do not play as many minutes during the games in season may need to practice more to match the same amount of exercise intensity as the players who play more minutes during games.
- This is important so that bench players do no become deconditioned throughout the season.