
bicycling
for WOMEN
GALE BERNHARDT

Bicycling FOR *Women*

Gale Bernhardt

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To my mother, Margie:
the strongest woman I know.

Contents

Introduction

If you are looking to improve your cycling fitness or simply get started in the sport, then this is the book for you. At your fingertips you'll find all of the essential information on effective training, good equipment choices, and smart nutrition. As a woman, an experienced coach, and a cyclist, I've long been aware of the limited attention given to concerns unique to female athletes. I am convinced that any woman with a good understanding of her physiology and the basics of training can enjoy a lifetime of cycling success—so let's get started!

Part I begins with useful information for both women and men. Chapter 1 gives tips for proper bike fit, which is critical to your cycling comfort and success. Although women and men have some obvious anatomical differences, it is the not-so-obvious differences and common misconceptions (for example, the misconception that women have shorter torsos than men) that can make bike fit a frustrating experience.

Chapter 2 begins the discussion on training. I'll explain how to improve athletic performance with periodization, gauge intensity,

determine your personal target heart rate exercise zones, and evaluate your progress. Chapter 2 also includes tips on goal setting to help you avoid common mistakes. If you learn how to set reasonable goals, progress will follow. Your fitness and health can be undermined by unreasonable goals because you'll eventually become discouraged and all progress will come to a halt.

With your personal goals in mind, you can get down to the details in Chapter 3 with training plans for five different cycling objectives. There is a 12-week plan to prepare for a 50-mile ride, a 12-week plan to prepare for a 100-mile ride, a 13-week plan to prepare for a 3-day tour, a 25-week plan to prepare for a 40-kilometer time trial or faster group rides, and a 25-week plan to improve climbing.

Although cardiovascular conditioning is critical for achieving cycling goals, strength training and stretching are also significant components of fitness, especially for women. Strength training can help prevent and repair damage from osteoporosis. Stretching can improve strength and range of motion; it also aids in the prevention of injury. Strength training and stretching recommendations are included in Chapter 4.

Physical training is not all you need for optimal athletic performance, and certainly not for optimal health. Proper nutrition is also crucial. Chapter 5 covers macro- and micronutrients, phytochemicals, caloric intake, and other nutritional guidelines essential to athletic training and recovery. Nutrition is always a hot topic; however, I do not prescribe a particular "diet." Your diet should be customized to meet your particular daily nutritional needs, and this chapter will help you identify what your body needs for optimal performance and health.

Chapter 6 offers mental tools that can prove useful in daily life and athletics. Two athletes can begin an event with comparable genetic abilities, physical strength and conditioning, and solid nutrition, and the race will go to the one with the strongest mental skills. The mind is a powerful ally.

Part II of this book is dedicated to women. It wasn't that long ago that women's participation in many events was prohibited because of traditional beliefs. In the August 1998 issue of *Runner's World*, a columnist noted that Danelle Ballengee, a world-class endurance athlete, had not been allowed to run the 1996 Ixta 18-mile mountain run because officials claimed it was too difficult for women. *Runner's World* quoted Ballengee as saying, "I guess they were afraid my ovaries would fall out or something." We are making progress in eliminating such barriers, but the job is not complete. I prefer to celebrate the ways in which women are unique rather than considering these qualities as limiters.

How different are we, really? Chapter 7 is an overview of some of the current research being conducted with female test subjects and female athletes. Although these research projects are valuable for both sexes, I'll pay particular attention to how a woman's physiology differs from a man's. As the data continue to amass, we can look forward to further progress in this arena.

Chapter 8 covers female hormones, the menstrual cycle, and how both affect athletic performance. Although the physical components of the system can be surgically altered, the hormones are critical to good health for women. This chapter also addresses some important issues such as prevention of osteoporosis through better hormonal balance.

Many women wonder if they can remain active throughout pregnancy. You'll learn more about the experiences of women who have already made the journey and review the current medical recommendations in Chapter 9.

As you age, you may be wondering if you should trade in your bicycle for a recliner or should boldly forge ahead as if you were still sweet 16. Our bodies inevitably change as we age. In Chapter 10, I'll help you anticipate those changes and give you plenty of recommendations to minimize some of the inconveniences associated with aging.

Finally, Chapter 11 is a collection of information about things that make cycling more comfortable or safer. It includes tips on such matters as saddle sores, travel, and hot- and cold-weather riding. This chapter answers some of the questions most frequently asked by athletes.

I hope you find the information in the book helpful. It is intended to give you a good understanding of the vast knowledge available to today's athletes, and more specifically, women athletes. I hope that men may find this book enlightening too—perhaps the female-specific wisdom will help some men understand what is going on with the women in their life. But first and foremost, this book is intended to answer the concerns specific to women like you, provide you with a practical plan for improved fitness, and challenge you to reach your next great accomplishment as a cyclist.

Enjoy!

Part I

Make the Most of Your Training

Part I of this book focuses on anatomy and bike fit, training concepts (periodization, intensity, testing, progress, and goal setting), training plans, strength training and stretching, nutrition, and mental tools. With the exception of the female anatomy and how it affects bike fit, and some nutrition information as it applies to women's health, all of the information in this section could be between the covers of a gender-blind book for cyclists. I believe there are no blanket differences between assembling training plans for men and for women. Based on research and my experience as a coach, how an athlete responds to a training stimulus is less about gender and more about genetics, anatomy, and lifestyle. I've trained women who could handle very high training loads and high levels of intensity work, and I've trained men who couldn't. Individual response to a training load is covered in Chapter 7.

But I'm certain you already know there are indeed differences between men and women. Women cope with a number of issues that men do not. When you dive into Part II, you will learn more about these issues and how they may impact your training and successful completion of an event. What I will tell you now is that you can do most anything you want to. All you need is know-how, patience, and perseverance. Let this book be your inspiration and guide.

chapter one

Anatomy and Bike Fit

Everybody wants to be treated like an individual and not as a statistic, and this is particularly critical when it comes to something as intimate as the fit of your bicycle. —*Lennard Zinn*

Riding your bicycle shouldn't hurt. The only discomfort you should ever feel is the self-induced muscle ache or fatigue that comes from riding fast or riding far. If you do experience bad pain, chances are the trouble can be understood through your anatomy or your bike fit.

Cycling equipment, from the bicycle and all of its components to the proper clothing, can make a big difference in your comfort and performance. While the best equipment cannot make up for poor conditioning, poor equipment choices can cause short-term and chronic pain.

Choosing the correct bicycle is determined not just by your height and weight but also by the length of your legs, arms, and torso, and more specifically by other measurements, such as the distance between your shoulder and hand grip. When all of these

aspects are taken into consideration in choosing cycling equipment, much of the pain and discomfort that cyclists experience can be avoided. Throughout this chapter, you'll be learning how to take your individual body dimensions into consideration when choosing a bike and whether you fall into the "average" range or outside it.

DOES GENDER MATTER?

The simple answer is no. Despite studies proving the contrary, the misconception that women are proportionately different from men endures. But in fact, while we are all individuals and have individual

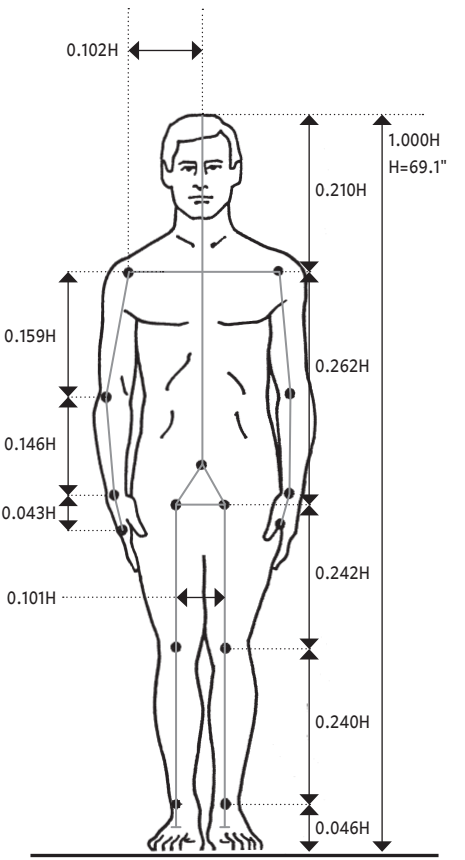

FIGURE 1.1 Body Segment Length in Proportion to Stature—Men
This illustrates the major body segments for men. The equations to predict the length of arm and leg segments from height (H) for U.S. men appear next to each segment.

(Data adapted from "The Measure of Man & Woman.")

dimensions, in the critical dimensions for cycling, the difference between the average U.S. male and female is surprisingly small. Proportional to height, the male and female dimensions of leg length, hand length, and arm length are nearly identical.

Figures 1.1 and 1.2 display the average dimensions from current anthropometric data. The average female measures 64 inches in height, while the average male measures 69.1 inches. The rest of the dimensions in the figures are expressed as a proportion of height. For example, in Figure 1.2, the female's femur (thigh) length is 0.241 × height (H). This average female's femur measures 0.241 × 64, or 15.42 inches.

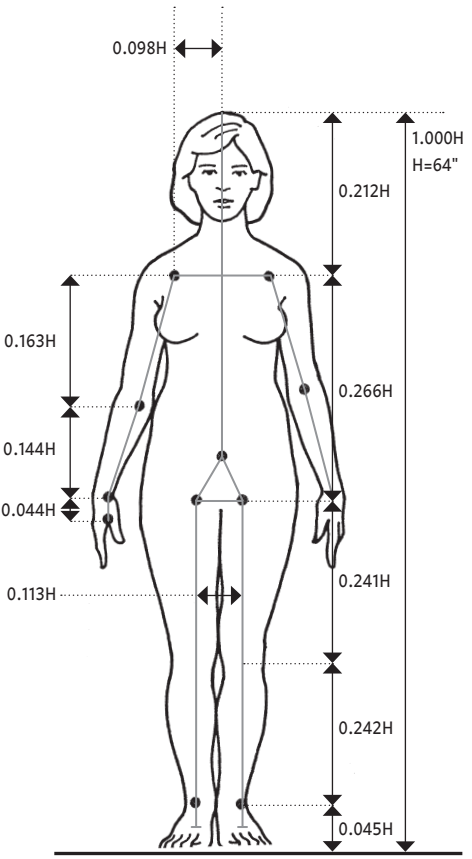

FIGURE 1.2 Body Segment Length in Proportion to Stature—Women
This illustrates the major body segments for women. The equations to predict the length of arm and leg segments from height (H) for U.S. women appear next to each segment.

(Data adapted from "The Measure of Man & Woman.")

Table 1.1 shows the differences in body dimensions for a male and a female of equal height. You can see that the female's key dimensions for bike fit are slightly shorter than those of the male except for grip area to shoulder length and shoulder width.

Because bicycles are not fitted by overall height, Table 1.2 shows the differences in key body dimensions affecting bike fit for a male and a female of equal leg lengths. For people within this data set, there is very little difference in the leg-length dimensions. There is less than a half-inch difference in torso length and hand-grip point to shoulder length.

It's important that you learn about your body dimensions so you can optimize your bike fit. We are not all carbon copies of the data set, with proportions exactly equal and to scale. While it's quite possible that your proportions fall within the average range, it is also possible that you have measurements that fall outside the average measurements on one or more dimensions.

One female cyclist I know is 64 inches tall, which puts her in the average range, but her arm, leg, and femur lengths are longer than average; her shoulders are wider than average; her torso length is

TABLE 1.1 Comparative Body Measurements for a Male and a Female of Equal Height

	MALE 64 in		FEMALE 64 in		DIFF* 0
Femur Length	.242H	15.49 in	.241H	15.40 in	-0.09 in
Tibia Length	.240H	15.36 in	.242H	15.10 in	-0.26 in
Leg Length	.528H	33.80 in	.522H	33.40 in	-0.04 in
Torso Length	.262H	16.77 in	.266H	17.00 in	-0.23 in
Grip-to-Shoulder Length	.348H	22.27 in	.351H	22.43 in	0.16 in
Total Arm Length	.414H	26.50 in	.414H	26.50 in	0 in
Shoulder Width	.102H	6.528 in	0.98H	6.272 in	-0.26 in

*H = height in decimal inches. Difference between female and male data, in inches. Positive numbers indicate the female dimension is greater than the male dimension. Negative numbers indicate the female dimension is lower than the male dimension.

shorter than average; and her hands are smaller than average. This knowledge helps her find and modify bicycles and clothing to fit her individual proportions, thus ensuring her comfort and ultimately enhancing her performance.

Similar Proportions

One of the tasks of Dr. Patrick Allen, coroner and forensic pathologist for Larimer County, Colorado, is to determine gender from skeletal remains. While this is easiest when he has the entire skeleton, if only the pelvic bone is available, he can accurately determine gender 95 percent of the time. If there's only a skull, accuracy is about 90 percent.

"In forensic pathology, we do not determine the sex of skeletons based on ratios of leg lengths to torsos," Allen says. "That type of data varies with the particular population sampled, including nationality."

If some things are of equal leg length, for example, men and women have very similar anthropometric proportions.

TABLE 1.2 Comparative Body Measurements for a Male and a Female Having Equal Leg Lengths of 35 Inches

	MALE 63.26 in		FEMALE 64 in		DIFF* 0.74 IN
Femur Length	.242H	15.31 in	.241H	15.40 in	-0.09 in
Tibia Length	.240H	15.18 in	.242H	15.10 in	-0.08 in
Leg Length	.528H	33.40 in	.522H	33.40 in	0 in
Torso Length	.262H	16.57 in	.266H	17.00 in	0.43 in
Grip-to-Shoulder Length	.348H	22.01 in	.351H	22.43 in	0.42 in
Total Arm Length	.414H	26.20 in	.414H	26.50 in	0.30 in
Grip Length	.043H	2.72 in	.044H	2.80 in	0.08 in

*H = height in decimal inches. Difference between female and male data, in inches. Positive numbers indicate the female dimension is greater than the male dimension. Negative numbers indicate the female dimension is lower than the male dimension.

FINDING A BIKE THAT FITS

Knowing the facts about men and women and proportionality will help you when searching for the appropriate bike frame. Finding the right bike and a good fit is more than just standing over the top tube and looking for clearance. Let's look at the important considerations for determining whether a bike fits you.

Figure 1.3 shows the anatomy and geometry of a road bicycle. Learning the proper terms is helpful in purchasing a bicycle. The rest of this chapter is focused on selecting a road bike.

One rule of thumb for selecting a standard road bike frame, not a compact frame, is to begin by standing over the bicycle in stocking feet. Lift the bicycle until the top tube is snug in your crotch. There should be one or two inches of clearance between the tires and the floor. Riding a frame that is either too large or too small compromises performance and handling and can put you at risk for injury.

Bicycle size is typically given in centimeters and refers to the length of the seat tube. A 54 cm bike will have a 54 cm seat tube. Frames are measured in two ways: center to top and center to center. Center to top measures the distance from the center of the bottom bracket to the top of the top tube or seat lug. Center to center measures from the center of the bottom bracket to the center of the top tube at the seat lug. The center-to-center measurement is 1 cm to 1.5 cm smaller than the center-to-top measurement. Be aware of this when you compare frames. Some time trial bikes have curved seat tubes. In this case, the "functional" length of the seat tube is used, which is the straight-line distance measured center to center or center to top. This is similar for compact frames. The functional top tube length is the distance from the center of the top tube, where it attaches to the head tube, to the center of the seat tube measured parallel to the ground.

Frame sizes in the 49—60 cm range are fairly easy to find. Some manufacturers make 48 cm, 47 cm, and even smaller frames, down to 43 cm. Small frames will often have 650 cc wheels that keep your foot and the front tire from interfering with each other on turns,

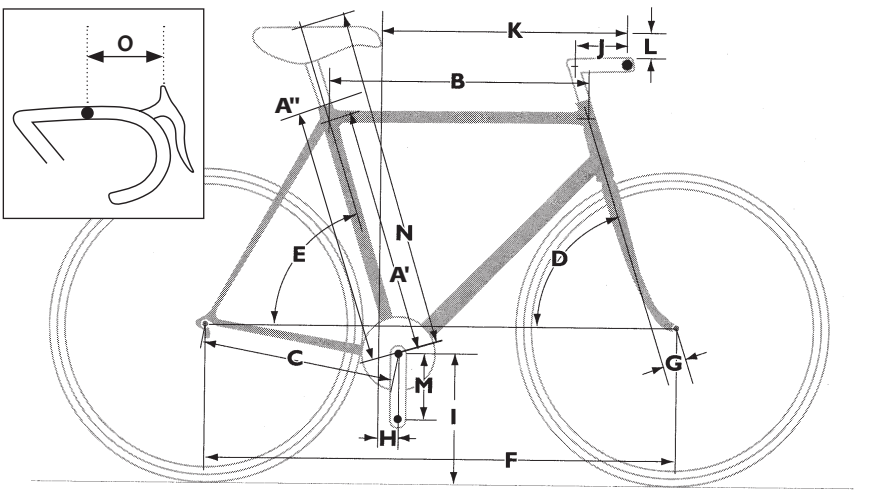

FIGURE 1.3 Road Bike Measurements

A'–Seat tube length, measured center to center

A"–Seat tube length, measured center to top

B–Top tube length

C–Chainstay length

D–Head tube angle

E–Seat tube angle

F–Wheelbase

G–Fork offset

H–Seat setback

I–Bottom bracket height

J–Stem length

K–Saddle to transverse centerline of handlebar

L–Seat to handlebar drop

M–Crank

N'–Seat height, measured from bottom bracket centerline (also shown in Figure 1.5a)

N"–Seat height, measured from pedal spindle (shown in Figure 1.5b)

O–Transverse centerline of handlebar to brake hood

and the overall length is shortened for better handling. Different frames may have different seat tube angles, the most common being in the range of 73 to 75 degrees, which allows the "average" cyclist to position her knees over the pedal axles with minor adjustments in the fore and aft position of the saddle.

A cyclist with a proportionately short femur wants a steeper seat tube angle to position her knees correctly over the pedals. A cyclist with a long femur wants a shallower seat tube angle. A cyclist who