

CHAPTER TWO

BREATHING

Yogis knew nothing of physiology, at least in terms that would have been helpful to 17th and 18th century European scientists and physicians like John Mayow, but for a long time they have made extraordinary claims about the value of studying the breath. They say flatly, for example, that the breath is the link between the mind and the body, and that if we can control our respiration we can control every aspect of our being. This is the endpoint, they tell us, that begins with simple hatha yoga breathing exercises. Every aspect of our being? That's a lot, by any standard. No matter: even though such comments may stimulate our curiosity, their pursuit is outside the scope of this book. Our objective here is to pursue studies in breathing as far as they can be tested objectively and experientially, and then to discuss some of the relationships between yoga and respiration that can be correlated with modern biomedical science: how different patterns of breathing affect us in different ways, why this is so, and what we can learn from practice and observation.

Breathing usually operates at the edge of our awareness, but will and volition are always at our disposal. Just as we can choose how many times to chew a bite of food or adjust our stride when we are walking up a hill, so can we choose the manner in which we breathe. Most of the time, however, we run on “automatic,” allowing input from internal organs to manage the rate and depth of our breathing. Yogis emphasize choice. They have discovered the value of regulating respiration consciously, of breathing evenly and diaphragmatically, of hyperventilating for specific purposes, and of suspending the breath at will. But even though these aims might seem laudable, readers should be made aware that the classical literature of hatha yoga generally warns students against experimenting intemperately with breathing exercises. Verse 15 of Chapter 2 of the *Hatha Yoga Pradipika* is typical: “Just as lions, elephants, and tigers are gradually controlled, so the prana is controlled through practice. Otherwise the practitioner is destroyed.” This sounds like the voice of experience, and we ought not dismiss it casually. We'll revisit the issue of temperance at the end of the chapter after having examined the anatomy and physiology of respiration. There are reasons for caution.

To understand the benefits of controlled breathing we must proceed step by step, beginning with a look at the overall design of the respiratory system, and then at the way skeletal muscles draw air into the lungs. Next

we'll see how breathing affects posture and how posture affects breathing. After that we'll explore how the two major divisions of the nervous system—*somatic* and *autonomic*—interact to influence breathing. Then we'll turn to the physiology of respiration and examine how lung volumes and blood gases are altered in various breathing exercises. That will point us toward the mechanisms by which respiration is regulated automatically and at how we can learn to override those mechanisms when we want to. Finally we'll examine four different kinds of breathing—thoracic, paradoxical, abdominal, and diaphragmatic—and the relationships of each to yoga breathing practices. At the end of the chapter we'll return to the issue of moderation in planning a practice.

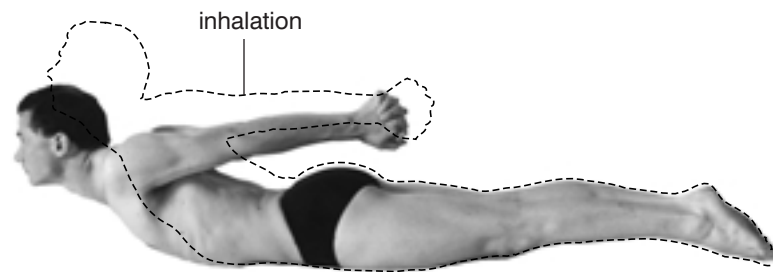


Figure 2.10. Cobra variation with tightly engaged lower extremities. Diaphragmatic inhalation (dotted line) lifts the upper half of the body over and above what can be accomplished by the back muscles acting alone (half-tone). Contrast with the diaphragmatic rear lift in figure 2.11.