



ANATOMY 101

if you don't know your bony landmarks from your lacrimal bone, a little anatomical knowledge can help you be a better instructor

by Jill Priluck

As a dancer, Tracey Mallett had strong abdominals, but like many in the Pilates universe, she wasn't using them correctly. Instead, she overcompensated using her rectus abdominis, hip flexors and glutes, excluding the deeper core muscles. But when she became certified to teach Pilates, she finally took an anatomy class.

"I began to understand anatomy and how to use the abdominals correctly by activating the transverse abdominis—and suddenly a lightbulb went off!" says Mallett, now the director of ATP Specific Training and Physical Therapy in Pasadena, CA, and author of *Sexy in 6* (DeCapo, 2008). "It was a missing link for me, finding how to recruit the

pelvic floor on my body correctly. I was not even entertaining that before."

Her experience underscores a valuable lesson for Pilates instructors: The more you know about the body, the better you can address its needs. With more than 10.6 million people practicing Pilates nationwide (according to the Sporting Goods Manufacturers Association's 2007 International Pilates Training Participating Report), dizzyingly diverse clients are strolling into studios, from baby boomers to college coeds, athletes to rehab clients—even people suffering neurological deficits. And all of them are increasingly seeking out instructors who not only understand the nuts and bolts of the

method but also the anatomy behind it. The U.S. Consumer Product Safety Commission (USCPC) stats show that 10 percent of the 40 million injury-related emergency room visits each year, are sports-related, but many certified instructors fall short in the anatomy realm. Imagine taking your car to a technician who wasn't an expert in auto mechanics. So why would you trust Pilates instructors who don't know their anatomy?

get smart(er)

"Knowledge is power, and understanding anatomy empowers Pilates teachers to assist people better," says Jeffrey Laitman, PhD, professor and



ILLUSTRATION BY PAUL GIOVANNOPoulos



director of anatomy and functional morphology at Mount Sinai School of Medicine and codirector of the Functional Anatomy for Movement & Injuries (FAMI) Workshop in New York City, a course for fitness professionals at the medical school. “The more knowledgeable instructors are about what they are seeing, the more helpful they can be in moving people to proper treatment and diagnoses and whatever else may be involved.”

People of every age are overusing and misusing their bodies in ways that evolution never intended them to—and in ways the body isn’t designed to accommodate, adds Laitman. Take rapid twists and turns of the knee in sports like football, soccer, tennis, skiing and even figure skating—sports that Pilates conditioning supports. Knowing the ins and outs of the anterior and posterior cruciate ligaments and how various movements implicate them, for example, should be an essential part of any teacher’s repertoire.

Then there are the underperforming bodies. Someone who sits at a desk all day may develop postural problems, like rounded shoulders. An inexperienced instructor may spend too much time developing the muscles of the anterior chest such as the pectoralis muscles—ones that are already too

strong and tight—and neglect other muscles like the rhomboids, the rotator cuff and spinal extensors, which help open the shoulders and the back.

Pilates teachers are evolving into sophisticated body-workers for injured

“Because I understood the nature and pathology of the injury as well as the nature of her arm’s hypermobility, I knew the parameters in which we could work,” he says.

The elderly population is also

people of every age are overusing and misusing their bodies in ways that evolution never intended them to.

clients who often spend more time on the mat than in their doctor’s office. “I’ve had clients for eight years with whom I meet religiously twice a week,” says Matt McCulloch, codirector of the FAMI Workshop and director of training and education at Pilates Academy International in NYC. “I know their bodies on a deeper level than their GP, because I see the aches and pains they go through.”

McCulloch cites an example of a longtime client who had injured her rotator cuff and required surgery but didn’t want to stop her workouts. So McCulloch and the woman’s surgeon formulated a plan to conservatively work on her shoulder-girdle stability to minimize postsurgery atrophy.

bringing its share of wear-and-tear injuries into the studio. The USCPSC reported a 54 percent increase in all sports injuries among individuals 65 and older between 1990 and ’96.

With Pilates recommended for everything from lower-back disorders and scoliosis to osteoporosis and joint pain, understanding how these and other conditions affect the method’s repertoire is a must for working with seniors. For example, lordosis, an extreme curvature of the spine, will make exercises like the Roll-up difficult to execute when lying supine. “A knowledgeable instructor would put a towel under the lumbar spine for support,” says Michael Esco, a physical education and exercise





science instructor at Auburn University (AUM) in Montgomery, Alabama. “Otherwise, there is nothing for the lower back to touch, and that could activate the hip flexors more than the abdominal wall and other muscles that

aren’t ideal for the movement.”

Instructors who know anatomy are one step ahead of the pack. Often, after insurer-allocated physical therapy sessions have ended, patients haven’t yet completely healed. So, before

exercising on their own, post-rehab patients are looking to Pilates to work sensibly within their limits. As a result, the more instructors turn to anatomy, the better equipped they are to avoid aggravating a given condition.

knowing when to say no

Learning about anatomy gives you a broader understanding of the human body, but what it doesn’t give you is license to diagnose and treat conditions. Anatomy courses aren’t modalities for training instructors how to diagnose and treat like a physician.

“Know when to step away and say, ‘I cannot help, you need to talk to a physician,’ or ‘I know I should not do this because it might make this situation worse,’” says Matt McCulloch. “It’s difficult for a Pilates instructor because you have this person in pain and they want you to help them. Say you have a client with a herniated disk at the point where it’s radiating and debilitating. Until an MD deals with it, we should not be instructing that person to move because we don’t truly understand the pathology of it. Without an MRI,

there’s no way to know for sure.”

Pilates instructors are not expected to have the in-depth knowledge of an orthopedist or a clinician. “If a client comes in with a medical form, I have to be able to understand their language, but not at the level of a surgeon. I have to know what is spine extension, spine flexion, and the biomechanical relationship of the bony landmarks,” says Bob Liekens, codirector of Power Pilates in NYC.

What teachers can do is listen, notes Pilates instructor and medical student Carrie McCulloch. “In the same way someone may tell their hairdresser important things, a client may say they are experiencing certain types of pain, and an instructor with knowledge of the nervous system can say, ‘I think that might be something to see your doctor about.’”

Refrain from impressing clients with your anatomical proficiency. If a client might benefit from anatomical information, translate medical jargon into simple terms. Your client is seeking a movement experience, not an analytical one.

“Constantly talking about anatomy can get heavy,” says Kelly Kane. “People get a certain kind of energetic response when they are cued in inspiring ways. For instance, when I want clients to engage the pelvic floor, I tell them it is like a jellyfish when it goes up in the water.”

“We live in the body, which is a set of bones and muscles, but it’s important to have awareness of the body you live in, what you can do and what you can’t,” says Liekens. “Pilates is about the wonders of the body and its limitations. We want to use those abs. We don’t want to talk about them.” —J.P.





“If a client just out of physical therapy is doing footwork and describes a generalized pain around the kneecap, an informed instructor will know that this can be associated with patellofemoral complaints and may use lighter springs or a smaller range involving less flexion,” says Karen Clippinger, a professor of dance and exercise science at California State University in Long Beach, a Pilates instructor and the author of *Dance Anatomy and Kinesiology* (Human Kinetics, 2007).

Anatomy is also useful for designing programs that work different muscle groups. When instructors tailor their sessions to individuals, clients are more likely to achieve their goals—and to return. “Some instructors with little anatomical knowledge pick their favorite exercises, like eight exercises for the abs, maybe one for the back and nothing for the rotator cuff,” says Clippinger. “A person going for strength will want a higher load with lower repetitions; for someone with joint problems, like arthritis, loading the joints with too much resistance can aggravate the condition, so it’s better to use lower resistance but with more reps,” she says, adding that a heavy load that causes joint stress can produce an inflamma-

tory response, among other reactions.

Pilates isn’t just the domain of boxers, dancers and athletes anymore. Nowadays you could see a Cirque du Soleil acrobat one hour and a joint-pain sufferer the next. Every client

STOTT PILATES (stottpilates.com), Power Pilates (powerpilates.com), Long Beach Dance Conditioning (longbeachdanceconditioning.com), BASI (basipilates.com), Peak Pilates (peakpilates.com) and Balanced Body

when instructors tailor their sessions to individuals, clients are more likely to achieve their goals—and to return.

comes into the studio for a different reason. It may be aesthetic (to tone inner thighs), it may be to improve strength and stamina (to prepare for a marathon), or it may be a functional goal (to be able to lift kids without recoiling from back pain). But if you can distinguish, say, a radicular nerve pain from a pain due to a muscle pull, you’re better positioned to serve the greater public and minimize exposure to liability. (See “Knowing When to Say No,” p. 64.)

go back to school

Many Pilates certification programs offer anatomy training—and some of them even require it. To cite a few examples, courses are offered by

(bbupilates.com); it’s a teacher-training prerequisite at Balanced Body, Polestar (polestarpilates.com) and the Kane School of Core Integration (kaneschool.com). “Pilates has always attracted people who are compromised because it’s been touted as a cure for everything that ails you, from unhappy backs, necks and shoulders to sexual dysfunction,” says Kelly Kane, a Pilates instructor and founder of the Kane School in New York City. “To be able to instruct my students in teacher training appropriately, they need to have a baseline of what all those things mean and, if they know anatomy—even if I don’t teach them everything—they can figure the rest out on their own.”





Many instructors take just such supplemental courses. Most colleges offer continuing education in human anatomy and permit nonmatriculating individuals to audit courses. These classes may be too in-depth for Pilates teachers since they usually cover the full body, including the digestive and respiratory systems in addition to the musculoskeletal system. Another option is the previously mentioned FAMI workshop

offers a six-day hands-on human-dissection workshop.

The FAMI workshop, cofounded by McCulloch and his wife, Carrie, a fourth-year medical student and Pilates instructor, with Jeffrey Laitman, the annual four-day FAMI course offers gross-anatomy lab sessions (the kind a med student would take), in which participants gain hands-on experience with cadavers, as well as lectures by orthopedists, neurologists

learn the lingo

Just because you know where the quadriceps is doesn't mean you understand anatomy. But once you learn what insertions and origins are (the points where muscles attach to the bone), you're on your way to understanding biomechanics. "When we talk about origins and insertions, we are talking about action," says Offiong Aqua, MD, professor of clinical anatomy at New York University. "If you understand the attachment of the muscles, it is easy to understand how they're able to move."

Take, for example, a client with tight hip flexors and resultant groin pain. If you know that hip flexor muscles like the psoas cross the front of the hip joint, then you can easily understand the ideal movements your client should perform to stretch those muscles and strengthen the opposing ones. Otherwise you might give your client exercises that might exacerbate the problem. You'll also learn that origins, for the most part, don't move, while insertions do. (One notable exception is the rectus abdominis.)

Anatomical knowledge gives you the means to assess a client's skeletal alignment. The protuberances along the spine? They're some of many bony landmarks that will help you identify structural abnormalities, provide a more

"everybody talks about the pelvic floor, but until you see a 3-D representation, it's hard to understand where it lies."

(famiworkshop.com). Clippinger (karenclippinger.com) offers a course in Long Beach, and Nora St. John offers one at Turning Point Studios in Walnut Creek, CA (pilatesontour.com). Offered in June, they all provide students a 3-D look at muscles by building them with clay on specially designed skeletons. Peak Pilates and Balanced Body also offer anatomy-in-clay courses (find them at anatomyinclay.com). Gil Hedley, founder of Integral Anatomy Productions and Somanautics Workshops (integralanatomy.com),

and sports-medicine physicians. A radiology session covers X-rays, CT scans, MRIs and other diagnostic methods from a fitness perspective.

The course demystifies the body, says Carrie McCulloch. "Everyones talks about the pelvic floor in Pilates, but unless you see a 3-D representation of it, it's hard to understand where those muscles actually lie," she says. "Where they sit can be an enigma for instructors, and without having a clear image of what the pelvic floor is, it is hard to cue clients."





accurate posture analysis and help you understand how muscles move. For example, when you can identify where your client's anterior and posterior superior iliac spines are on the pelvis, you will be able to tell where your client's pelvis is sitting and whether his center of gravity has shifted or is off-balance. "By knowing bony landmarks, you can almost predict motion without it happening," says Aqua.

"If you don't understand where major bony landmarks should be, it's difficult to understand proper body alignment," he says. Matt McCulloch agrees: "If you can locate the right and left hip bones on your client's body, then you can tell whether the right hip is lower than the left and if the muscles attaching to the body are short on one side or long on the other."

Then there are the agonists and antagonists. These can help you understand which muscles oppose each other and how to program for clients with muscle imbalance. The agonist is the prime mover, the muscle or muscles that create movement. The antagonist is the muscle or muscles that are opposing that movement. When raising the leg back, for example, the agonists are the hip extensors, including the hamstrings; the antagonists (the ones that elongate) are the hip flexors, including the rectus femoris. Generally

speaking, antagonists elongate while prime movers contract. If your client has a hyperextended knee, knowing the agonists and antagonists will help you determine that the muscles doing the work (the quadriceps) are probably tight and overworked, while the muscles opposed to that hyperextension (the hamstrings) are a group you might want to strengthen.

"Pilates instructors have a lot of background and can often list various

may affect it can help an instructor understand why an arthritic spine or a herniated disk can cause a client so much grief," she adds.

Anatomy can help you see the big picture—literally. "If you can imagine where a spinal nerve exits the vertebral column and the dangers it may encounter along the way, you can start to understand why movements like combined flexion and rotation or excessive extension may provoke pain,"

"if you understand the attachment of the muscles, it is easy to understand how they're able to move."

insertions and origins and muscles, but they start scratching their heads when we talk about the nervous system," says Carrie McCulloch. Muscles, she says, do not move on their own, and instructors who are familiar with nervous-system anatomy have a keener sense of the body as a whole, especially when it comes to common injuries. For example, familiarity with the nervous system complements a teacher's knowledge of spinal anatomy. "Understanding the nerve pathway and how movement

says Carrie McCulloch.

Understanding the human body is in every instructor's best interest. Take it from a pro who knows how to correctly activate her abs. "If you want to keep a full schedule," says Tracey Mallett, "then you owe it to yourself and your clients to understand the purpose of every single exercise, what muscles they are recruiting and why you are doing it."

Jill Priluck is a freelance writer who lives in New York City.

