Eleven Years to "Begin to Understand"

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From a recent conversation I had with a close friend—an exceptionally accomplished physician in his field (it should be obvious which one)—I found myself unexpectedly unsettled by a number.

He said:
To become a specialist, you need five years of training in general surgery, then three years in orthopedics, then three years in spine surgery—and only then can you begin to understand the problems. Eleven years after medical school.

We were speaking specifically about treating scoliosis.

He continued, explaining that these eleven years are required not for mastery, but merely to **start understanding** the problem. Real understanding—let alone innovation—requires deep knowledge of embryology; anatomy, including blood supply, innervation, and lymphatic drainage; pharmacology; and, in this case, the spine itself. Beyond that, one must understand diagnosis and treatment, and also how scoliosis affects related systems: sleep, respiration, digestion, and even the reproductive system.
"Eleven years," he concluded, "is nothing."

My Question
I understand complexity. Truly. We are talking about a system with many interconnected elements—agreed.

And yet, those **eleven years** continue to amaze me.

So I posed a thought experiment. If you take a group of bright students right after college, do you really need eleven years to teach them *enough medicine* so that they can begin to understand the problem? If not—if it could be done in less time—then where is the bottleneck? In the teachers? The students? The system itself?

I want to be clear: I am talking about a **narrow medical specialty** and a **specific problem**—scoliosis. I do not distrust him. On the contrary, his explanation was complete, clear, and impressive. I am simply puzzled by the scale of time involved. And intrigued. I am trying to understand it using frameworks borrowed from other sciences.

Interdependence
His response was simple and firm:
You cannot understand the spine independently of the rest of the body. It's like the Talmud—to truly understand it, you must know all its parts, because they are interconnected.

Then he gave an example from his own practice.

A woman experienced no pleasure from sexual life and had been divorced twice. The cause was scoliosis in the pelvic region of the spine, where sensory nerves to the genitals pass. After surgery, function was

restored. She later gave birth to two children—though without epidural anesthesia, due to residual scoliosis. Importantly, a full anatomical correction of the scoliosis would have resulted in muscle atrophy. Partial correction was the optimal solution.

A precise, nuanced, and entirely convincing example.

A Parallel System

I told him the example was perfectly chosen, and asked whether this was personal experience or textbook knowledge. I fully accept the deep interdependence of organs and functions in the human body.

What helps me *feel* this interdependence is my background working with a nuclear power plant.
A nuclear station is a massive, tightly interwoven system. Nearly every element matters. Components exist at vastly different scales. Control is handled by an extraordinarily complex system, where unexpected interactions are not just possible—they are inevitable. And when they occur, they can lead to surprising, sometimes emergency-level situations.

In that sense, the resemblance to the human body is striking—though, of course, in humans, everything is orchestrated far more harmoniously.

At that point, I tried to step back and view our conversation from one particular angle—my own.

Looking Back: Education and Selection

I returned mentally to my student years in my former country. With the slight arrogance of youth, we believed—based on observation—that the smartest high school graduates chose mathematics, physics, and engineering, not medicine. Career paths were chosen early, at around seventeen. Admission thresholds reflected this: passing grades for medical school were dramatically lower than for top programs in basic sciences.

Yes, there were outstanding doctors—but they were not products of mass medical education. They were exceptional individuals who happened to love medicine. Access to them, whether through official channels or personal connections, was difficult.

Coming to this country, I was struck by something very different. Physicians here, in aggregate, are well compensated, socially respected, and treated as part of the intellectual elite.

The System Itself

Over time, I began to sense how the medical system here actually functions.
Admission to medical schools is tightly regulated by the AMA to prevent overproduction. Supply determines the price of services. To maintain this balance while still producing sufficient numbers of physicians, an extremely **narrow specialization model** evolved.

The result is many doctors who know a great deal about very little—while only a small subset truly learns the human body as an integrated, interdependent system.

My friend belongs to that subset. He is an exception. He uses his eleven years of training well.

Most physicians, however, spend their professional lives digging ever deeper into a bottomless hole of specialization, leaving systemic complexity either untouched or only superficially understood. I am deliberately oversimplifying—but only to make the point that **what most doctors actually learn does not require eleven years**.

Looking Forward
Artificial intelligence will change medicine profoundly—and it is already happening. Despite institutional controls, we are seeing a form of overproduction: physicians becoming increasingly interchangeable, income declining, and social status eroding.

Again, this is my perspective. It is incomplete, provisional, and very much open to correction, challenge, and reality checks.

But the question remains—and it still fascinates me:
Do we truly need eleven years to begin understanding a problem—or do we need eleven years to fit into the system that teaches it?