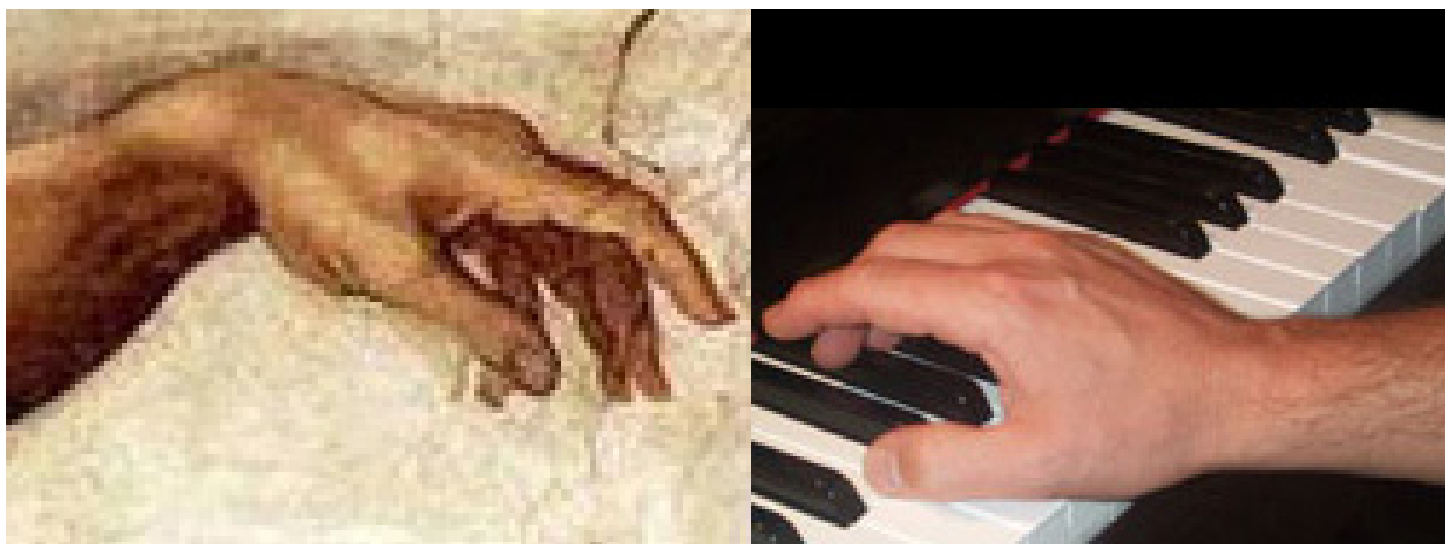


*How to Prevent RSI:
The Michelangelo Code
a Hand-Book*



*The Essential Keys to Solving RSI
naturally, for everyone*

*by internationally renowned concert pianist
Alan Kogosowski*

Foreword

*A*rt book, mystery, or self-help book?

Almost all of Michelangelo's work is permeated with a sense of effort and struggle, for man's existence, in his view, is one of struggle. His work is overwhelmingly preoccupied with the human form, in a vast range of situations and positions. A brief look through the enormous gallery of figures he created shines a light on the human body in every kind of state, from rest to extreme exertion.

As an artist, Michelangelo sought to convey ideas about the meaning of life, death and the Universe, and upon the nature of beauty, which was to him the most visible manifestation of Divinity that we can experience in our lives. But if we look carefully at his creations, we can also learn a great deal about the purely physical characteristics of human activity. This is information worth having for everyone, because we are all wearing down our physical resources through exertion and repetitive strain, simply by using our body.

This unavoidable phenomenon – the constant attrition on our bodies – comes with the territory in simply being alive. While we think a great deal about it with regard to our larger body movements – walking, running, lifting, especially heavy objects, and of course our breathing and heart rates – we tend to overlook it when it comes to the use we make of our hands, because the movements of our hands and fingers are apparently so small.

Yet they are essentially *repetitive* movements, recurring in a similar form hundreds and even thousands of times every day. This is more and more the case in our modern life, with the growing use of hand-operated devices in every sphere of life – and it is very much in inverse proportion to the use we make in daily life of the rest of our body.

Michelangelo was, of necessity, and virtually by definition, first and always a craftsman. The ability to give physical shape to a conception is an artist's starting point. The craft has to be in place before anything can be made a physical reality. Most human skills are transmitted through our hands. Using tools to build, writing thoughts and ideas, playing a musical instrument, carving a representation out of an inanimate block of stone or depicting it on a canvas or wall, taking care of ourselves and others, driving a car. Almost everything. The fabulous artistic skills of a Michelangelo or a Beethoven began with their hands, and from this point of contact with their craft they were able to shine a light on the eternal for the rest of humanity.

We all need to use our hands if we are to accomplish most of the things we need to do, even if we're not Michelangelo or Beethoven. Typing on a computer keyboard, for instance. We must be able to master the technique of using our hands on the computer, just as Michelangelo had to learn to hold a paintbrush or chisel and do so on a constant and endlessly repetitive basis.

As with all skills, the solution consists in simplification rather than complication. Less is more. Pare down the task to its essentials, and nothing more. Anything more is unnecessary strain. Or goal must be *economy of movement*. All artists and sportsmen will understand this. The directness and simplicity of the stroke we use when swimming determines whether we glide with ease or struggle laboriously in the water. But this economy-of-motion principle applies to all of us when we are engaged in any physical activity.

The unstrained naturalness with which we use our most important tools – our hands – determines whether we glide through the tasks we have to accomplish every day, and minimize the inevitable attrition of wear and tear – or become slowed down and pained in an ever increasing struggle.

In music, many have sought to see a divide between the ‘musical’ side and the ‘technical’, or physical, side of performance. This is misleading, as the two go hand-in-hand. Moreover, the ‘musical’ objective is the same as the technical one – namely, that everything should flow effortlessly and naturally. Michelangelo once answered a question about how he carved the David by saying that he chipped away everything from the huge block of marble that wasn’t David. That’s just what Beethoven did too: he started with huge blocks of sound that seem to represent the Universe, chipped away at them and compressed them down into 40-minute symphonies and 25-minute sonatas.

The technical and the musical are all about simplification, the refining away of obstacles, both aural and physical, just as in sculpture and painting it’s about the refining away of visual impediments to our perception of a higher dimension.

But this is really a book about the physical aspects of using our hands in the course of constant, repetitive activity – in *all* such activities, and especially that of using a computer keyboard and mouse in the 21st century. So let us proceed to unravel the code hidden not very far beneath the surface of Michelangelo’s work, remove some of the mystery, and make simple that which we are all able to do – use our hands to accomplish everyday tasks in a way which will free us for creativity and accomplishment.

What does a book on RSI really have to do with sculpture and music? The link between the physical side of what a pianist does – “technique” (but as noted above, ‘technique’ is in fact inseparable from the ‘musical’) – and the seemingly mundane act of typing, an activity which is becoming more and more important in today’s computerized world, and which carries similar pitfalls, was suggested to the author by music critic, writer and journalist Juliette de Marcellus – author of *Rose and Henri* and editor of *Atlas of Man* – a lifelong student of music and the piano especially. Her encouragement of the writer to share his knowledge with the wider public, instead of simply using it to master the fabulous literature of music by Beethoven, Chopin, Liszt and Rachmaninoff, led to the development of *The Michelangelo Code*, as well as the pianist-directed *Mastering the Chopin Etudes*.

For further insight into the scope of this subject see www.kogosowski.com - RSI

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The Michelangelo Code

The Hand - A Brief History



*T*his is one of the most famous hands in history – that of Michelangelo's David, created five hundred years ago. The original owner of the hand lived 3,000 years ago. It's noticeably too big for the young David, probably because Michelangelo was presumably trying to give a sense of the power soon to be released from the youth.

The hand is at rest, but it's starting to tense, the index finger contracting with the anticipation of the sling shot that it will soon throw. But the shape and position of the hand are unmistakably relaxed and confident, sure of the task it is about to undertake. It's in control.

What is it about the position of this hand that suggests complete control and confidence?

The wrist is loose, the thumb hangs loosely and slightly curved, ready to *grip*, and the hand is falling loosely in the natural position for which it was designed – namely, to take hold of something, to throw, to dispose of. We have no doubt at all that this hand will achieve its aim – to hit its mark accurately and surely. The fact that the hand is oversized lends the entire composition a magisterial quality, perfectly natural and appropriate for the future king of Israel.



Here's another famous hand recreated by Michelangelo. The original owner of this one lived even longer ago – Adam. This hand has no tension in it whatsoever. It is completely free and natural, and it's the central feature of this conception – it is the conduit through which God is transferring Life, via His index finger, into the first human being.



*H*uman shapes and sizes have altered considerably in surprisingly short periods of time – as a result of improved living conditions, diet, sanitation and medicine. But the mechanical design of our bodies, the engineering behind them, has not changed at all.

We can immediately see from Michelangelo's sculptures and paintings, and the many drawings and studies of human physique by Leonardo, that our hands haven't changed in any way in the past 500 years. No one has ever thought of questioning Michelangelo's assumption that the form of a youth who lived 3,000 years ago would be in any way different from our own. Or, for that matter, the physical form of the very first man, Adam. Neither literal interpreters of the Bible, nor anyone else, would dream of arguing with that assumption – the former because we were created in the image of God, the latter because when the first 'man' arrived on the scene he had already evolved into the shape – and was equipped with all the essential physical characteristics – which distinguished him from all other living beings.

But think for a moment of the difference the past 3,000 years – or even just five hundred – has seen in the way that we actually *live*, much as there has been no change in our bodies' design and therefore its capabilities.

Up until just a few generations ago, most peoples' lives were spent within a very small area, in which they worked, farmed, and in general did most of the things necessary to daily life by their own two hands. A small number of eccentric, adventurous souls became explorers and travellers, and there was a surprising amount of movement between countries in the way of trade, but the vast majority of people spent their entire lives in a very circumscribed existence. The only means of travel over land was – in one form or another – thanks to the help of the horse, man's essential partner since pre-history. Who pays any attention to the horse these days off the racetrack? Yet for thousands of years, the horse was an essential part of life. We couldn't go anywhere or transport anything without our loyal friend and helper.

In winter how did we heat our houses, or water for our baths, or stoves for cooking, until very recently? We made a fire. And we couldn't do it easily with the help of neat little factory-processed matches. Even if we didn't have to rub sticks together, there was lots of stoking and carrying coals, really laborious physical labour. Thus, things we consider to be everyday necessities were treated as luxuries for special occasions. For example, once the bath had been filled with hot water, bucket by bucket, everybody shared the same water, starting with the head of the family, going down. By the time you got down to the littlest, the water was so murky that one might not see what was in it, hence the saying "Don't throw the baby out with the bath-water." Once the sun went down, how did we see anything? Once again, fire – in order to light candles.

It seems incredible to us now, but since the dawn of time until just one hundred and thirty years ago, when Thomas Edison discovered the fragile little filament which would create electric light in a little transparent bulb, the only way that you could see anything at night – unless there was a full moon – was through the agency of fire. It sounds positively stone-age, but that's how it was until the time of our great-great-grandparents.

And what did we do by the light of those candles? As there was no television, no radio, no sound systems and no computers – and only for the last five hundred years have there been printed books – people had to speak to each other a lot more than they do today. More often than not, however, they went to bed much earlier than we do – when the natural light of the day had disappeared – and got up with the dawn.

So much has changed externally, in the way we live and go about our lives. But our bodies haven't changed – apart from the odd appendix or wisdom tooth we no longer need – since Adam. Why is that?

Our body's design hasn't changed because the tasks for which it was intended didn't change very much in their essentials, and consequently there was no need for our bodies to adapt.

We were designed and adapted perfectly to accomplish whatever tasks we needed to accomplish. The engineering of our bodies and its many moving parts, including the vast array of muscles, tendons and sinews, is right up there with the complex engineering of the most sophisticated motors, airplanes and rockets. And of course the capabilities of our brains have yet to be equalled by any computers. We can sit astride a horse and direct him with our arms and legs as if we were built for that purpose – although in fact, humans didn't ride horses in that way until very recently in human history; our arms are perfectly designed to make the motion of rubbing two sticks together; and, tiring as it is, our backs and shoulders are perfectly designed to have heavy sacks slung over them and carried by our arms. Planting and hoeing, an essential part of most peoples' lives throughout most of human history, are activities the body is built to handle, and can do from morning till night. All broad-brush activities.



2. *A New Set of Tasks for our Hands*

Very few of us in developed countries plant and hoe today, lug sacks of grain or coal, and it's unlikely that anyone but top-of-the-class scouts could produce a fire by rubbing sticks together. Nearly all of us in modern societies spend most of our waking hours sitting in a chair and using only one part of our bodies – our *hands*, with back-up of the hands' efforts from our forearms, elbows and shoulders.

This is a *completely* different regimen from that which has prevailed for 99,900 of the past 100,000 years. Even just one generation ago – no more than thirty years – we were much more active physically, using much more of our bodies. Walking a lot more; getting up and down to change the television channel because we didn't have remotes (just think about that one for a moment – how much aerobic exercise do you get from repeatedly raising your body out of an armchair and settling it back in, an activity which the remote control has completely eliminated?); going to the shops for everything we need to buy (lots of different shops, not one central one, as supermarkets are hardly more than fifty years old, and department stores not much more than a century). Until very recently we had no option of ordering things over the phone or booking via the internet; the list goes on and on.

It was recently reported that the average dress size of women, and men's body size too, has increased considerably since the end of the 2nd World War. That's partly because of improved nutrition, but it's also very much because we don't move our bodies as much as we once did – by quite a long shot. Many people try to address the imbalance by going to gym three times a week, but that's not the same as the regular, automatic use of a much greater percentage of our bodies in our day-to-day lives than we experience today.

Not only is this a completely new and different regimen in our lives – it's a completely different set of tasks than those for which our bodies were designed and have been employed for the past 100,000 years. The tasks for which our arms and hands are designed were adapted from the way our forerunners used them in trees. Our hands were designed to *grip* and our arms to swing – that's why we love ball games and always have – and to hang and swing in a slightly inwardly curving manner.

When we started to walk upright, without the aid of our arms to hang on to branches or propel us along the ground by gripping on to wayside posts, we adapted our hands and arms to be able to enact movements which were fundamentally similar in nature, but tailored to specific requirements – movements required by planting, hoeing, lugging, wielding tools of all kinds, rubbing sticks together, pulling on the reins of horses, throwing balls, or using sling shots.

3. 88 Troublesome Keys (before we narrow the problem down)

As our arms and hands adapted long ago to the new tasks that were required of them by a settled, agrarian, community style of life, we're now at a new crossroads. We don't even have to procreate in the old-fashioned way – many people are doing it artificially these days, without any involvement of bodily movement at all. But the function of our hands cannot be replaced, and they now need to adapt to the requirements of a fully mechanized life – or, more to the point, we need to work with the design of our hands in order to accommodate the demands of a mechanized lifestyle.

So where are we at the beginning of the twenty-first century, in terms of what we are actually using our bodies to do?

Most of us in the western world spend most of our lives sitting in a chair or a car seat using our hands and nothing else. A very large part of our total bodily activity consists of constantly holding up our hands and using our index finger repeatedly – to press remotes, operate mouses, open our cars, switch on the radio when we get inside, turn up the central heating in our homes, heat something in the microwave, set the video, programme anything and everything in our highly mechanized lives. And then, in order to get our heart rate up, use our fingers to book a session at the gym, then use our index finger to set the heart-rate counter and the pedometer.

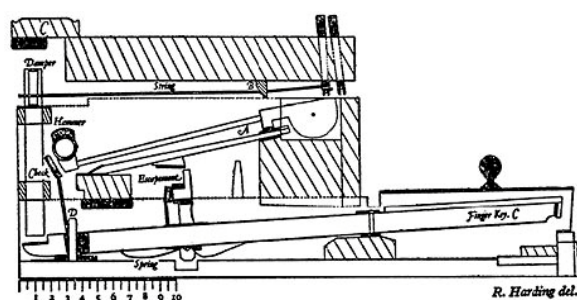
The first people who were required to adapt the use of their hands on a constant basis to a *mechanical* device were pianists. The piano was to the 19th century something like the television and radio are to us. It was the first mass-produced mechanical device to become a regular part of the home, for use in hours of amusement and pleasure.

But it was also the first mechanical device to require constant use of our hands and fingers. Think about it – a machine operated by all the fingers on a repetitive basis for hours on end. Just like a computer keyboard and mouse. Pianists have been doing it for two hundred years now – not a long time in human history or evolution, in fact nothing at all, but much longer than anyone else using their hands in a repetitive way on a mechanical device, day in, day out.

The first piano was built around 1700 by Bartolomeo Cristofori in Florence. We can see a fine example of one of Cristofori's pianos in the Metropolitan Museum in New York. Interestingly enough, as with all good inventions, from the printing press to the camera, it was pretty well in its definitive form right from the very beginning.



However, the piano didn't really take off until the last two decades of the 18th century, because the harpsichord was at its zenith during the first half of that century. The harpsichord looks superficially like a predecessor of the piano, but in fact it was a quite different instrument – one in which the strings were plucked by a quill instead of struck by a hammer, with no variation possible in sound quality or nuance.



Although one operated the harpsichord by means of a keyboard, the amount of pressure required from the finger movement was much less than that needed to play the piano. You could almost blow the keys down, so to speak, and you certainly wouldn't ever bother to tighten the muscles in the arms and body in order to produce the necessary amount of force in the action of the fingers. The keys of the piano, on the other hand, would require a good deal more pressure in order to go down effectively and sound with all the various nuances of which the instrument was capable.

The action of depressing the keys of a piano causes the hammers to “strike” the strings. From this expression has come two centuries of misery, in the form of debilitating hand strain, for a large number of pianists – professionals more than amateur – as the word ‘strike’ was so often confused with the finger action by which the keys were pressed down.

Striking keys with our fingers while they’re in a flat position – an action which employs the *extensor* muscles of the arms which operate the fingers – runs counter to the natural function for which our hands were designed. Although it seems like a very small movement, when multiplied by thousands of times the strain builds inexorably into a repetitive strain *injury* in the wrists and forearms. With many pianists it has been, and continues to be, a crippling one.

The other debilitating injury caused by the keyboard occurs through the repetitive use of the thumb in an up-down movement like the other fingers. This action is the only one possible on a flat-surfaced keyboard, but it’s an action the thumb is not at all designed to do.

These two incorrect and injurious actions of the fingers upon piano keys are identical to the two major debilitating actions of the fingers when typing on a computer keyboard.

The whole trick to playing the piano – apart from the necessary feeling, emotion and musicality, which is of course no trick – is adapting the use of our hands to operate all day long, every day, in what may be termed an artificial activity, i.e. one that’s not suited to the way our bodies, and hands in particular, are designed, *without engaging the long muscles* which lead from our fingers and hands up through the wrist up into our arms.

A century after the piano really started to develop, a new keyboard would emerge that was to have a culture-changing effect on our civilization, the biggest such culture-changing effect since the invention of the printing press. The importance and ubiquity of this new keyboard continues to grow exponentially from day to day in our own time. The new keyboard, instead of dealing with notes and sounds, was occupied with words, but the demands on our hands and fingers were to be *identical* to those made by the musical keyboard.

On June 23rd, 1868, the American inventor Christopher Latham Sholes was granted a patent for what he termed a ‘Type-Writer’. After the piano, this was the next major mechanical device to employ our hands on a constantly repetitive basis, day in, day out.

Like the piano, the keys of the typewriter needed to be struck by the fingers with a certain amount of force, but this happened naturally enough because of the way the hands were thrown about with speed and abandon from the wrist, creating a loose dead-weight heaviness in the hands and forearms. This natural and comfortable movement of the arms and hands was brought about by the substantial incline of the typewriter’s keyboard, with its terraced rows of keys, as well as the constant flipping movement of the wrists when throwing the shaft back at the end of each line.



Christopher Scholes' first 'type-writer'

Today's computer keyboard requires considerably less force from the fingers than that of the typewriter in order to depress the keys – which is the entire objective for the fingers. It's rather more like a harpsichord in the degree of finger pressure it requires. This is particularly true of the laptop computer keyboard. However, what is gained in conservation of energy with each finger stroke is more than lost by the diminishment of free movement of the hands enjoyed on the typewriter, where they were happily thrown about up and down, and backwards and forwards to the return shaft.

The flatness of the modern keyboard is also an impediment – it is even flatter than the piano keyboard, let alone the typewriter, as the piano, of course, has a large number of black notes raised to a terraced level a full half inch above the basic keyboard level.



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