How to Prevent RSI

The Michelangelo Code

A hand book for everyone

by internationally renowned concert pianist

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The Michelangelo Code

The essential keys
to solving RSI naturally,
for everyone

Foreword

Art 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, the "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 the music critic, writer and journalist Juliette de Marcellus – author of *Rose and Henri*, *A Funny Thing Happened on the Way to Carnegie Hall*, and editor of *The 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 *Mastering the Chopin Etudes*.

Contents

1. The hand - a brief history

This 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 unmistakeably 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 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 – Adam – lived even longer ago. 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.

Human 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 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 very recently – the time of our own 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. Eight-eight mechanical keys, before we narrow the problem down to the keys on a computer (same difference)

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?

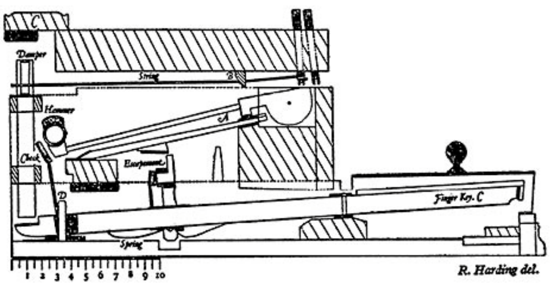
Most of us in the western world spend most of our lives sitting in a chair or a car seat using our hands and nothing else. A very large part of our total bodily activity consists of constantly holding up our hands and using our index finger repeatedly – to press remotes, operate mouses, open our cars, 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 19^{th} 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.



Cross-section of key action from original diagrams by Crisofori, 1716

Key (right side of drawing) is pressed down like a computer key;
then the hammer (left) strikes the string – unlike a computer, which
employs electrical connections.
The inner workings are hidden, however; the actual mechanism as it
applies to our hands is identical in both piano and computer: the physical action
required of the fingers and the positioning of the hand is identical in both cases

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 (because they spend more time doing it, and do it in a more forceful and repetitive way) – 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 Sholes' 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.

4. The wrong movements for our hands

Adapting the use of our hands to operate all day long in an artificial, or repetitively mechanical, activity, then, is the problem. As we just saw in our quick look at the pianist's problem, our hands are *not* adapted, above all, to two movements into which we all tend to fall when we approach any keyboard, piano or computer. This is because a *keyboard – any keyboard – is basically a flat surface, and thus does not allow our hands to* ***grip****, which is the primary thrust of their design* – or push-button devices of any kind.

First and foremost in this latter category is the computer mouse, which we will look at in greater detail shortly.

One of those two injurious movements is sticking the fingers out straight: *extending* them. The other is using the thumb in an up-down motion: keeping the thumb straight and whacking it down on the keys, an action we are forced to do by any and every keyboard (because they are flat).

Remember, when we're say 'injurious', we are referring to a small movement the adverse effects of which may seem negligible in the short term, but we are nevertheless referring to a movement which is repeated over and over again identically, thousands and thousands of times, and with each occurrence adding a little extra to the taxi-meter.

The trouble with these two movements – which of course seem very small by comparison with many of the other things we do with our bodies, like lifting and carrying, running or even simply walking, is twofold:

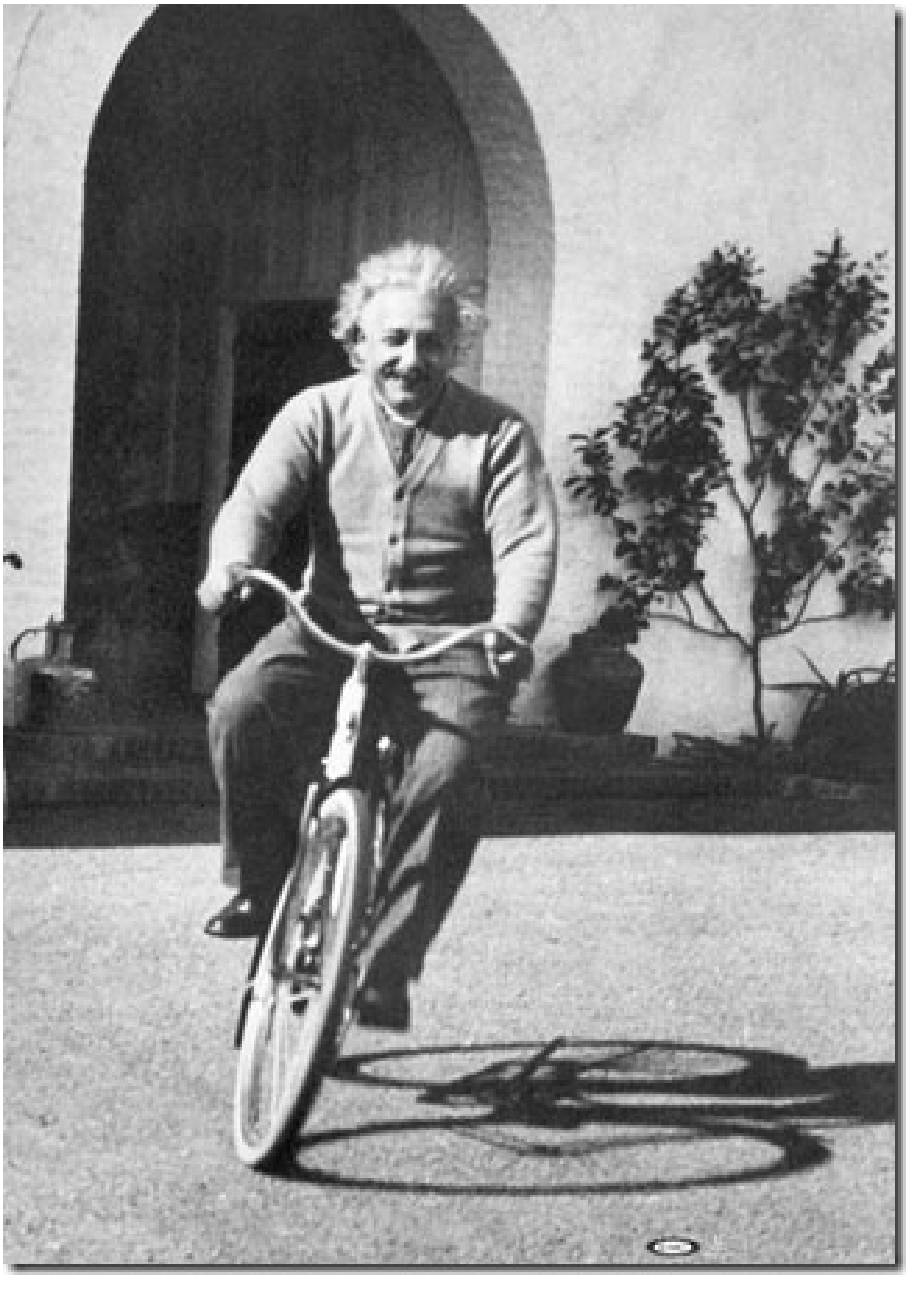
Firstly, the seeming smallness of the movements of our fingers in relation to larger bodily activities is deceptive, because although there are small muscles which play a part in operating the fingers, ***all of the fingers are also connected by long muscles up into the forearm and beyond***, right up to our shoulders and into our backs.

Secondly, we move our fingers constantly whenever we are operating mechanical devices, tools and instruments, and especially keyboards and mouses. ***The movements of the fingers are repetitive – they repeat hundreds of times*** every hour, thousands during the week. How many hours do we sit at a computer during an average day? Hence the strain we are placing on the muscles – small as it may appear if looked at as an individual movement – is *repetitive*. *Repetitive* Strain Injury. RSI.

So although the movements of our fingers may be small by comparison with many of our more strenuous activities, they are going on nearly *all the time*, in a constant stream, and they are building up a bank of injury to the muscles, nerves, tendons and ligaments in our forearms and wrists – through which most of the muscles operating the fingers pass – elbows (*tendinitis*) and beyond.

What are we going to do about it? Take relaxation breaks?

The only way relaxation breaks will help us is they'll stop the gradual but inexorable build-up of strain and injury in our arms and wrists for a brief period. It's like stopping a taxi-meter for a short while. While we're relaxing – which is to say not doing the thing that's causing us the injury – we're obviously not adding to the problem. But we're not fixing the damage that has already been done – we still owe what's showing on the meter. As soon as we go back to what we were doing we continue to add to the bill – in strain, fatigue and injury. As Albert Einstein said, "We can't fix a problem by using the same thinking by which we created it." You just go round and round doing the same thing and adding unnecessarily to the meter.



5. Doing what comes naturally, despite the keyboard

The only solution is to try to use our fingers and hands in ways which ***do not engage and strain the long muscles which lead from our fingers and hands up through the wrist into our arms***. It's vitally important not to fight against what comes naturally – what our bodies were designed to do – in the way we are engineered and designed to operate.

As we know, our hands were designed to *grip*. But what does that actually involve? When we grip something, our fingers curl inwards, bending at their joints, and the thumb opposes the other four, which is to say it moves in from the side, laterally – or sideways to the hand – at a lower plane from the other fingers, in order to secure the grip. Our cat can reach up and try to turn the door handle, because he's seen us do it, but he can't get a grip on the knob, so he jabs desperately at it with his whole paw, usually in vain.

The thumb is probably the one thing that more than anything else separates us from all other living creatures, and has allowed us to develop as human beings. No one else in the animal kingdom can hold anything at all with their hands, hence they can't use tools. Using tools allowed us to develop our reasoning powers: "If I use this tool I will produce such and such effect, from which I can proceed to X, Y and Z." We're the only ones on the planet who can do that, who can think that way – i.e. logically. And it all started with the thumb.

Look at a keyboard. When we place our hands on the surface ready to press down the keys, the 'natural position' of the thumb – i.e. so that is placed to operate at a ***lower plane*** from the fingers – has evaporated. This is a direct affront to the essential position of the thumb, depicted so perfectly by Michelangelo, and known to all medical students and plastic surgeons as '***position of function***'. It's the way the hand *must* be kept when it is set in a cast after injury.

Ideal position of hand, or, in surgeons' terminology, 'position of function'

With the contravention of the natural position, or ‘position of function’, of the hand, forced upon us by keyboards, as well as mouses, the natural movement of the thumb – a lateral, or sideways, movement – is virtually impossible. The thumb can no longer move sideways, as it is designed to do. On the keyboard, the lower part of the index finger is there blocking its way, while in the case of the mouse the side of the device does likewise.

When we factor in the basic design of the keyboard, piano or computer, in which all the keys move *up and down* and therefore require an up-down movement of the fingers, the only action possible for the poor old thumb is an up-down one. So not only is the thumb’s natural sideways action blocked off, it’s required to do an *un*natural action – an up-down movement. Moreover, it’s pressured into doing it on a constant, repetitive basis. If you move your thumb up and down for just one minute, you’ll start to experience sharp pain and fatigue, so imagine the true effect that hours of typing are having upon it.

Our main front-line soldier – the one which defines our human status as being able to grip – has been severely compromised. Not only has he been put in a position where he can’t do his job, he has been put in a position which will actually hurt him when he is forced to operate like the other fingers, which he’s going to have to do. We’re going to force him against his natural design to move up and down, in doing so fighting his sideways joint at the base and the other joint half-way up, and we’re going to force him to operate at a plane that’s two or three inches higher than that at which he’s connected to the base of the hand. This is a rotten thing to do to our greatest asset and loyal friend. By undermining the function of our thumb, we might as well use our noses to press the keys down, just as our cats and dogs would.

The military terminology is not inappropriate. Our ten fingers are our little army, each finger with a different set of skills and capabilities, while the wrist and forearms are the back-up and supply lines. ‘Surgical operations’ – in the military sense – are what we need in all activities requiring physical exertion of any kind. Because we are using up our physical resources, the quicker and more efficiently we are able to accomplish any given task the better.

The more *in*efficiently we tackle any task, the debit we suffer comes to us in the form of strain. And that strain comes where we don’t expect it: not on the front lines, in the fingers, but in the *supply lines* – the long muscles which run from the elbow down the forearm, through the carpal tunnel in the wrist, and into the hand and fingers.

Unexpectedly as it always seems, the movements of the fingers, on the front line of the action, will cause inflammation far away – first in the elbow (*tendinitis*), and finally, closer to the action – though still removed from where the movement is actually taking place – in the wrist. Eventually the narrow passage in the wrist – the carpal tunnel – through which the extensor and flexor muscles that control the fingers must pass, becomes chronically inflamed, a condition known as ***Carpal Tunnel Syndrome***.

6. *What is carpal tunnel syndrome?*

The carpal tunnel is a space in the wrist through which nine tendons and the *median nerve*, necessary for movement of the hand and arm, pass. The bottom and sides of this tunnel are formed by wrist bones, while the top is formed by a ligament called the *flexor retinaculum*. The tendons are covered with a lubricating membrane called *synovium*. If aggravated, the tendons and synovium will enlarge and swell, and this swelling can in turn cause the median nerve to become compressed, resulting in numbness, tingling in the hand, clumsiness and pain. If the swelling continues, symptoms can become more serious, even leading to paralysis of the hand and forearm.

Carpal Tunnel Syndrome is a difficult condition to overcome once it has become established in the wrist. The numbness, burning sensation, and tingling will usually be felt most acutely at night, when we've stop typing or playing for a few hours, our hands having gone into a relaxed mode and stopped doing the activity which has injured them during the day. We'll feel a general fatigue and inability to move our fingers effectively while we're working. The condition will steadily worsen and the pain can become quite intense. A number of very well-known pianists, especially in the United States, have become completely paralysed in one hand (nearly always the right, because that one does more).

Anti-inflammatory drugs are often prescribed for this painful condition. Mild cases can be treated by applying a brace or splint, usually worn at night. This keeps the wrist from bending or twisting – and keeps the hand in its "position of function." Resting the wrist allows the swollen and inflamed synovial membranes to shrink, relieving pressure on the median nerve.

Eventually, a surgical procedure called a ‘release’ may be performed. By this method, the *flexor retinaculum* – the ligament that forms the roof of the carpal tunnel – is cut, in order to relieve the pressure on the median nerve caused by the inflammation. However, this procedure, while common and usually successful, is more often than not only a temporary fix. The problem starts up again after a while, unless we have altered our hand-usage habits (‘You can’t fix a problem by using the same method by which you created it’). Also, the nerves have often been subjected to blood supply loss over a long period, and permanent damage to the muscles in our hands and forearms has been sustained. These painful afflictions in turn rebound upon the hands and fingers, preventing them from being able to operate properly.

Keyboards and mouses aren’t the only culprits in this growing problem. Any form of repetitive straining of the hands – that is, using our hands in a constantly repeating manner in a strained way – will eventually lead to RSI, tendinitis and carpal tunnel syndrome. Grasping any kind of instruments – gardening or carpentry tools, writing implements, paint brushes, chisels, screw-drivers, the neck of a guitar, violin or cello – forcefully over a sustained period ***with the thumb in a straight and rigid position***. More of this later. Also, of course, it can result simply from the after-effects of broken or dislocated bones. But keyboards and mice are the big culprits as far as most people are concerned.

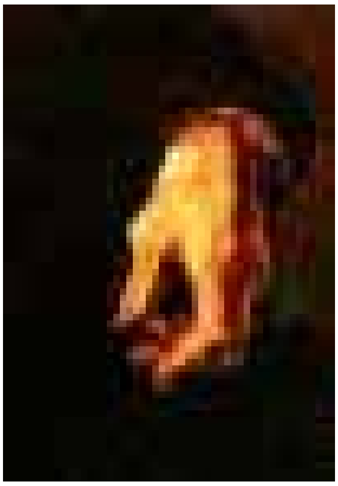
If Michelangelo hadn’t understood the *position of function* of the hand so well he would surely have developed pain, numbness, tingling and debilitation of his hands and arms, as well as the back problems and exhaustion he suffered from the four years that he contorted his body, holding his paintbrush straight up, in order to paint Adam and everyone else on the ceiling of the Sistine Chapel.

The real trouble with muscle strain in our bodies stems not from the exertion itself – we have an enormous capacity to exert ourselves as long as there's an end to the exertion – but from the fact that strain is *cumulative*. It doesn't ever really go away; it slowly and surely builds up, compounded as we do the same movements over and over and over again.

As we know, relaxation isn't the solution. What people generally mean by 'relaxation' is that they take a break from doing whatever it was they were doing that caused the strain or stress. But that just means that as soon as they go back to doing whatever it was that caused the problem in the first place, the build-up of strain, and in fact *injury*, for that is what is occurring, continues – from the level at which the strain was left.

Coffee breaks wouldn't have helped Michelangelo while he was painting the ceiling of the Sistine Chapel. (There was no coffee in Europe in 1504 anyway – that would have to wait another three quarters of a century for Walter Raleigh to bring it back from the New World). But relaxation break of any kind every now and again would have merely delayed the inevitable build-up of injury to his hands and arms if he were holding his paintbrush with a straight and stiff thumb. With the extra burden of holding his arm straight up, the attrition on his hands, arms and torso would have been unbearable.

Our only solution is to do the job at hand correctly in the first place – to make movements with our bodies which do not strain us *at all*, and if we have already injured ourselves, to correct the movements so that we don't add to the problem. As we won't be straining ourselves any longer, hopefully over time the injury will gradually, though unavoidably slowly, repair itself.



Michelangelo's hand at rest; Kogosowski's hand in 'position of function'

7. *Tendinitis*

You don't have to play tennis to get tendinitis, or tennis elbow, as it's commonly called. You can get it just as easily from typing on the computer keyboard for long periods with your index finger too straight. Or from using a mouse with your index finger too straight and extended.

When we point at something, we are sticking out our second finger, and it is being held up and extended by a long muscle which starts at the elbow and extends the full length of the forearm on the upper side of the arm, down through the wrist and into the finger, right to its tip. Each finger has an *extensor*. It also has *flexors*, which operate the fingers from underneath, making them bend inwards. Flexors, unlike extensors, come in two varieties – long ones, which extend into the underside of the arm, and short ones, which are contained within the hand.

It's the aim of every pianist to operate his fingers by the *small flexors* – the little muscles on the underside of the fingers which pull them in and downwards – and nothing else. As these small muscles don't go into the wrist, and have nothing at all to do with the forearm, there is no strain emanating in those two crucial areas, the wrist and the forearm.

Don't look at God's hand. The extensor operating His index finger – the long muscle used to raise the finger, which extends through the forearm to the tip of the finger – is working much too hard, holding the finger right up at the base joint. If held too long in this position, the result will inevitably be strain in the forearm and tendinitis. But the act of Creation was completed in a time frame unrelated to our standards of measurement or comprehension. It was probably over in the blink of an eye – or touch of a finger – and the finger was not held in that position for any prolonged time, or any time at all. Also, even though God obviously didn't get it right the first time, with man still a work in progress today, we can assume there was no *repetition* of this movement, hence no *repetitive* strain. Constant *repetition* of straining movements of the fingers and hands, no matter how slight they may seem on an individual basis, is the problem.

8. Of mice and men

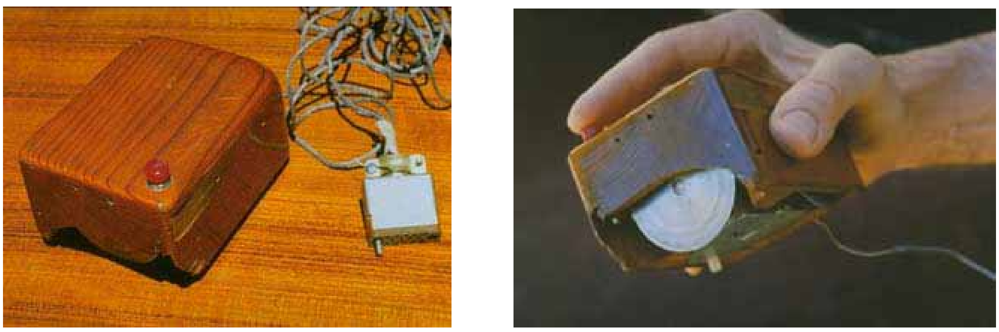
The two major sources of conflict, then, between our body's design and the tasks we are required to do so much of these days are the natural design and motor skills of the thumb and those of the index finger.

All the fingers are forced to stick out too straight on the flat surface of modern keyboards. This constant demand wages a slow war of attrition on the muscles and nerves of our fingers, wrists and arms. But the index finger has an extra share of the burden than the other fingers, surpassed only by the strain endured by the much-oppressed thumb. Once upon a time our index finger just had to point. Then it took on the role of rudder for our hand in writing, as well as using a knife and fork. These days, it has suddenly become inundated with demands for its services as operator of all manner of push-button devices – remotes, digital clocks, videos, dvds, microwaves, etc.

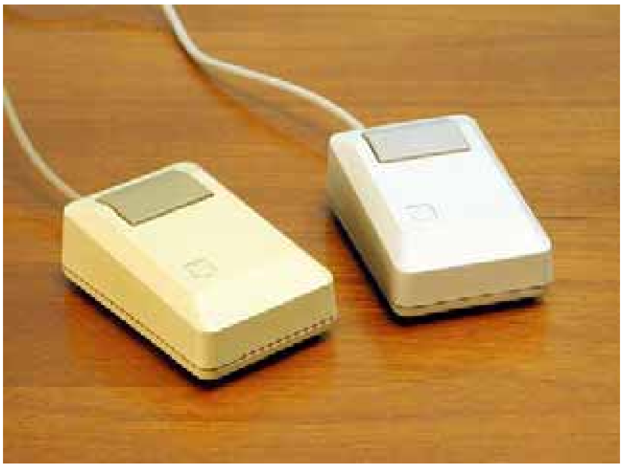
Above all, in terms of strain – because this is a very repetitive movement done over many hours on a daily basis by so many people – the index finger has to operate the cursor with the computer mouse.

Patented in 1970 by Douglas C. Engelbart as an "*X-Y position indicator for a display system*", the mouse was originally a wooden box with two perpendicular gear wheels. The two wheels would soon be superseded by a single external tracking ball which could rotate in any direction, and which was detected by the perpendicular wheels, now housed inside the mouse.

Engelbart revealed that the nickname 'mouse' originated from the wire coming out the back which looked like a mouse's tail. At first the device was also known as a 'bug'. An accomplished inventor, philosopher and pioneer of the computer age, Engelbart never received any royalties from his great invention because it would be another two decades before the device was to become indispensable to personal computers, by which time the patent had run out. "Stanford Research Institute patented the mouse, but they really had no idea of its value. Some years later I learned that they had licensed it to Apple for something like $40,000."



The first mouse, 1970, with Douglas Engelbart's hand on his invention



The Apple Mackintosh Plus Mouse, 1986

Mr. Engelbart's index finger shows the way an index finger should *not* be held for any protracted period of time. Although mouses have developed, to say the least, since the prehistoric-looking 1970 model, the position we see in this photo is still the same position in which the index finger finds itself today, hour after hour, day after day, when operating a mouse. Pointing – for that is the position in which the finger finds itself – is something we can do momentarily, but we cannot hold our finger in that position for any amount of time at all without straining our hand and arm. It's not the *finger* that's strained, but the muscles of the forearm which are holding the finger up via the hand – which in turn spread the strain to the longer muscles in our arm, and eventually – if we do it long enough, or *repeatedly* – will cause inflammation in the carpal tunnel of the wrist.

As we already know, when we grip something – grip being the essential movement for which our hands are designed – our fingers curl inwards, bending at the joints, with the thumb opposing the other four, i.e. moving in from the side, at a lower plane from the other fingers.

So *all* the fingers need to curve inward slightly. As a young piano student, my piano teacher made me drop my arm limply by my side. "Look at the position of the hand," he said. "*That* is exactly how the hand should be when you place it on the keyboard." He made me do it every now and again to remind myself of the natural position of the hand. In that position (the position of Michelangelo's hand hanging limply, on p. 24) – whether it's hanging down or held up, resting on a keyboard – there's no strain.

With the computer mouse, the index finger is sticking out not quite *entirely* straight, but it's most definitely straighter and more extended than it is when it's in its natural position, i.e. the position it's in when it hangs down by our side, as we can see right away. Because there's a little amount of curve in the position of this finger, the attrition of injury is slower than that incurred by fully straightening the finger, as it would be if it were pointing, but the attrition is lurking there and it is constant.

Another cause of slow but continual attrition on our hands is the way the mouse separates our third and fourth fingers.

There's a tendon between adjacent fingers at their base, and this tendon allows them to move laterally, enabling the hand to spread out, rather like a duck's webbing. With one exception: the junction of the third and fourth fingers. The fourth finger is joined to the central finger like a Siamese twin, and can no sooner be separated in its lateral mobility than can such a twin. This was the phrase used by Chopin in the notes he made for a manual for pianists.

If we try to push apart the fourth finger from the third, we're going to injure ourselves, as did another great pianist/composer, Robert Schumann, while determinedly but wrongly trying to build up the supposed 'strength' in the 'weak' fourth finger. This finger simply cannot be pushed apart from the middle finger because of the absence of a tendon.

The mouse is so designed that it employs the index finger and the third finger for left and right buttons. These two buttons are usually more or less equal in size and shape, although the second and third fingers are *not* equal in size, and the middle finger starts and ends higher up than the index finger. If you are right-handed your third finger will be manning the right button, and your fourth finger – the Siamese twin finger – will be stretched away from the middle finger in order to allow it clearance on the button, as in the picture below.

If you're *left*-handed, the same thing applies in reverse, although in your case, the longest finger, rather than the index finger, is dealing with the left button, the all-important cursor, while the index finger – our most nimble and authoritative finger – is relegated to operating the less-often used right button.

9. I type, I curse, ergo I need a better keyboard and mouse

The unappealing word *ergonomic* is a new one in our lexicon. It is not to be found in dictionaries of twenty years ago. The only word like it we can find there is *Ergometer* – an instrument for measuring work or effort, from the Greek *ergo*, meaning work. *Ergo* is also, of course, used to connect one statement with its syllogism, signifying conclusiveness: such and such, therefore the following must work...

The word 'ergonomic', as a hybrid concoction signifying a supposedly new field of study, is similar to the study of 'acoustics' – the idea of turning into a subject for study that which is an integral part of something we have been doing since time immemorial as a matter of course, and as such have more or less taken for granted. In both cases, a well-meaning attempt is being made to quantify and systematize a complex yet completely natural phenomenon, one which is dependent on a harmonious combination and interaction of many varied elements.

As with the new academic study of 'acoustics', the term 'ergonomics' is basically used as a catch-all for any new idea which will *perhaps* improve machines or devices used for work. As such, it is rather amorphous, and quite non-specific. Any idea for a new shape which will supposedly make a keyboard or mouse or other instrument more convenient to use is described as 'ergonomic'.

Which shapes are truly conducive to less strain, and which are merely stabs in the dark? The term 'ergonomic' is so new and all-encompassing that it allows for virtually anything to pass under its banner. More often than not, the expression will cover keyboards and mice which are just eccentrically shaped. The keyboards usually are based on the general idea that curves are better than straight lines – an idea which is in the right ball-park from the point of view of the fingers and hands, but not necessarily so for the devices they are to operate. The intellectual rigor behind some of these shapes – which occasionally put one in mind of kidney-shaped swimming pools – is not at all always in evidence.

There is also a range of aids, such as wrist supports. These are of course less confronting than the colourfully-shaped paraphernalia, and make less claim as to their effectiveness. These humbler solutions do seem to provide a quick-fix in some cases, but again – as with relaxation approaches – do not address the main problem. Such aids have a parallel in the field of acoustics with 'baffles', or polystyrene clouds suspended from the ceiling of concert halls. Maybe they do help a little to reflect the sound, but this is only a temporary solution – and a half-baked one at that – to the *real* problem, which is that the concert hall overall has been incorrectly designed and built. Instead of extraneous suspended from the ceiling, it would be better to have a correctly built hall, and instead of wrist supports and funny-shaped keyboards to alleviate in some way the injury we are slowly and surely doing ourselves, it would be better to get the position and operation of the hand right.

The most radical 'ergonomic' conceptions involve taking the repetitive, full-time use of the hand out of the equation altogether.

We have been hearing about the advent of voice-activated computers for years, but they still seem in the realm of science fiction, certainly for daily general use. In 2001, a sixteen year-old schoolboy in Wales, Tobias Patterson, invented a 'mouse mitt', after his mother developed RSI, with the idea of allowing people who suffered badly from repetitive strain injury to operate a computer mouse without actually using their hand physically. Tobias devised a glove to attach to a mouse-like device, which would allow the hand to move through the air as sensors sent messages to the computer, moving the cursor on the screen by impulses sent through the air. The invention attracted national attention in the UK after being seen on The Discovery Channel's *Science Night*.

Tobias' idea of trying to find a way of allowing the hand to maintain its natural position – curved fingers, with thumb falling well below the rest of the hand, i.e. 'position of function', was absolutely correct. But the idea involved complicated electronics which would require much expensive development.

Natural is best. We must ensure that a) the thumb remains as close to its natural position as possible at all times, and the only way to do that is to watch that it ***bends at the joint at all times***, and, as far as is possible, given the demands of a flat keyboard, that it rests in a position decidedly ***lower than the rest of the hand***., and b) that the other four fingers are gently but definitely curved.

In the absence of voice-activated computers and remote-control mouses, the only viable solution is the ***Kogo Mouse Cover***, which ensures our hands are always in their natural 'position of function', and that we don't have to *think* about its position all the time. Also, these give the possibility of both right- and left-handed varieties – the first instance anywhere of left-handed people being considered when it comes to mouses.

10. What can we do about it?
(apart from understanding, which takes care of a lot)

What are we going to do about the fact that our fingers are extended into too-straight a position by the flatness of the computer keyboard, and the index finger in particular is straightened beyond its natural curve by the mouse?

First of all, we need to look at that ideal position of the hand as it hangs down by our side, as if we were preparing to play the piano. Playing the piano or operating the computer keyboard – it's the same thing as far as our hands and fingers are concerned. We need to get used to it, and watch the hand all the time, in order to be sure that it is in fact in that ideal position.

David's index finger is a little too flexed for the at-ease '*position of function*' *we want (it's extra-flexed because he's getting ready to launch a stone from his slingshot), but his arm is relaxed, the shoulder unhunched, the hand falling freely*

We can see this free, hanging-like-a-dead-thing phenomenon best of all in dogs. When we play with their paws, they tense nothing at all, because they have absolutely no expectation or *anticipation* of movement. Their paws are completely at rest, and there is no contraction at all in their arms or their shoulders. Although we humans are in fact anticipating movement in our own hands, ***we must try as much as possible to adopt this dead-thing hand position***.

Another useful way of accustoming ourselves to the gentle curve which the fingers should always have is by sometimes typing on the keyboard (only as an exercise) in hunt-and-peck style – i.e. with just the index finger of each hand. Professional typists please don't be alarmed: this is only in order to get used to the correct 'position of function' in which the hand should ideally be at all times, or as often as is humanly possible.

When we type in this fashion, the hand automatically falls into an ideal position for activity. ***The index finger is curved, the thumb lies beneath it instead of beside it, and it is also bent at the joint as well as at its base***, the other fingers are all curved – as in the at-rest position of Adam or David, or hanging by our side – and ***the wrist is loose***.

With 'hunt-and-peck' typing, primitive as it may seem to speed typists, all of the activity is concentrated *within the hand*, and the long muscles leading through the wrist up into the arm are never engaged at all.

First and foremost, this is because we've got the position of the hand absolutely right. But also, this correct position is then reinforced by the hand being thrown gently and easily up and down at the wrist. All engagement of the long muscles is nullified, the action and all activity completely stopping at the wrist. No tightening of the long muscles, no build-up of strain. Perfect. Remember, the *arm* is where the major problems begin, and the wrist where they come home to roost.

On the old-fashioned typewriter the hands fell automatically and naturally into a 'hunt-and-peck' kind of motion, as they flopped around at the wrist, in fact were *thrown* – not just up and down but sideways at the end of each line to return the shaft to its starting position. Consequently, no one ever got RSI from a keyboard (except for pianists, of course).

One of the first typewriters, a Sholes model. The amount of tossing of the hands required by this keyboard and return shaft would have obviated any tightening of the wrist and hence any possibility of RSI or carpal tunnel syndrome

Also – though it may prove impractical over the long term – try if possible to avoid using the thumb on the space bar, using the index finger instead.

As we know by now, one of the chief culprits in causing us tendinitis, carpal tunnel syndrome, and everything in between, is the constant use of the thumb in an up-down motion. This motion almost automatically causes the thumb to become straightened (danger signal!) and consequently *rigid* (!!!), it's all over.

This cannot be avoided unless the thumb is constantly monitored. A pianist must simply watch the thumb all the time – when practising at home and when performing in concert halls. You can never let up. Master pianists are always devising fingering patterns in the music which will limit the use of the thumb to the greatest extent possible, using other fingers instead.

But of course, the thumb simply *must* be used often, especially in chords. Therefore, when it comes into play, the clued-in pianist will watch it like a hawk to make sure it does not straighten, tighten or become level with the other fingers.

To a certain degree this may be possible with the space bar of the computer keyboard. We can't really substitute the index finger for the thumb on the space bar, but we can watch the thumb as much as possible to try to ensure that it connects with the bar at the side of the tip – by the edge of the thumbnail – ***not on its side***.

The pianist must watch the thumb ***all the time*** in order to ensure that it is making contact with the key at this point on its tip, and *only* at this point. In combination with the fact that the thumb must remain loosely dangling, two to three inches below the rest of the hand, it usually ends up just glancing off the edge of the key when it is used.

Exactly the same should apply to the thumb's employment on the computer keyboard – especially the space bar. Place the hand and the thumb in such a position that it will glance off the edge of the space bar, and ***not depress it by hitting it with its side!***

Thumb making contact with the key (or space bar, as the case may be)
at the edge of the tip of the thumbnail, and not on the side of the thumb itself

11. All roads lead to the thumb

All roads lead to the thumb when we are engaged in using our hands. It's the elephant-in-the-drawing-room of all activity associated with our hands. Remember, animals can't do anything at all with their hands, except jab at things with their whole hand as a paw, *simply because they don't have an* ***'opposing'*** *thumb*. When the question is repetitive strain, it all comes back to the thumb. Animals don't get RSI, because they don't have opposing thumbs.

As we have already learnt, ***any action which undermines the natural sideways movement of the thumb is dangerous and bound to lead to trouble if repeated again and again.*** We also found that when the thumb is raised to the level of the other fingers it cannot move sideways, being blocked in this motion by the base of the index finger. It also places a great strain on the muscles in the forearm to raise it to this unnatural and awkward position.

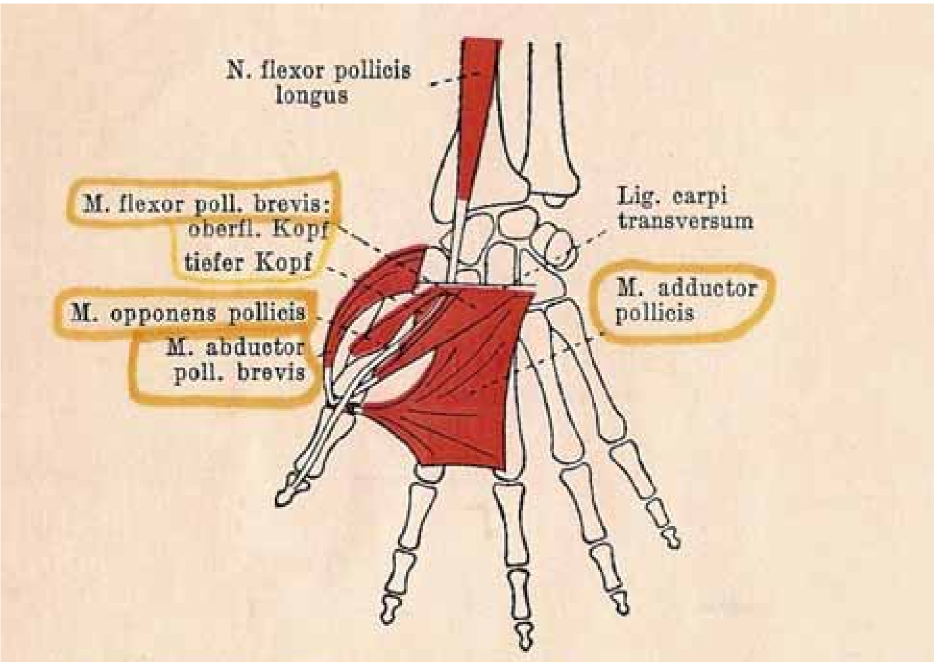


Abb. 23. Die Oppositionsmuskeln des Daumens (unter Benutzung einer Abbildung von Hoepke).

The only way of ensuring that the thumb remains as close to its 'natural' position as possible is to make sure that it ***bends at the joint at all times***, and that it rests in a position on the keyboard decidedly ***lower than the rest of the hand***.

When the thumb is raised – against its natural disposition – to the side of the index finger, it cannot effectively bend at the joint. It can bend a little, but not very much. Too often when the thumb is in this position, we forget that it should bend *at all*, and if we are in a hurry, or stressed, thus forcing things, we tend to straighten the thumb *completely*. The thumb presses against the rest of our hand so tightly and rigidly, and so straight, that it actually bends backwards!

This configuration of the thumb and the pressure on it is perhaps more noticeable when we use tools and implements. Gardeners often experience chronic debilitation of their grasping powers, carpenters likewise with their tools. Just think how we hold a screwdriver – thumb straight, rigid and forcing – when we're screwing in something which doesn't go easily. And of course pens, pencils, paint brushes, knives and forks.

It's also prevalent when we hold a stringed instrument – any instrument with a neck: a violin, cello or guitar. The left hand grips the neck in such a way that the thumb is straighter than straight, even appearing to bend *backwards*, something it's not built to do *at all*! If you try this movement for just a moment you will see how injurious it is. The base of the thumb immediately becomes untenably tight and strained, and the damage begins to build in the wrist and forearm from the word go.

We see St. Bartholomew in *The Last Judgement* in the Sistine Chapel gripping an implement with his right hand in a manner bound to cause tendinitis if done repetitiously. He is gripping it very tightly and his thumb is pressed straight and rigidly against the object, *so* tightly in fact, that it is almost bending backwards – which the thumb can't physically do, but it seems as if it does.

His other hand, holding the skin which was stripped from him when he was martyred, likewise is going to run into trouble because his thumb is not flexed, i.e. bent inwards and doing its part in the gripping process by making contact with the object with the tip of the thumb, by the edge of the thumbnail. But then, he was clearly not in a mood to concentrate on his hand-position.

This straightening and tightening of the thumb also occurs, of course, when we use it in an up-down movement – i.e. just like the other fingers – on the keyboard, but it's more noticeable when we use implements such as those described above.

And even though we don't grip it as tightly as we do gardening tools, screwdrivers, guitars, pencils, paint brushes, chisels, knives and forks – and even though the thumb rests in a position a little lower than the other fingers, the computer mouse also taxes our thumb in this way, because the surface curve of the average mouse is shallower than the curve of the 'position of function' of the hand.

The difference between a slightly bent thumb at the joint and a straight, unbent thumb is massage therapy, physiotherapy, pain-killers, acupuncture and long term problems of debilitation.

12. What about our posture?

We're sitting in a chair, hunched over, using our hands and fingers and nothing much else except for our brains. But there's also a hidden agenda going on in this physical process – namely the strain on all the muscles we're using to hold up our arms and hands. We're talking, of course, about our posture.

When a pianist walks out on stage and takes his seat at the piano we can tell immediately if he's a master or if he belongs to the ninety percent of performers who may be very talented but will sooner or later (usually sooner) develop carpal tunnel problems, tendinitis, and even in some cases complete paralysis of one of the hands.

How can we tell this? If someone sits down on the piano bench as if it's a chair, they are not placing their body in a position whereby the arms and hands will be able to function freely and naturally for a long period of time, or accomplish complex repetitive movements with the hands and fingers.

When we sit comfortably on a chair, we are making ourselves feel apparently comfortable overall, but we are not providing any support for our arms if they are to be raised and outstretched. Once we raise them to the keyboard they're out there on their own – they have no back-up, no help from anywhere. And while it may seem like a small imposition, if we do it to them for hours, they're going to get awfully tired.

Specifically, the big muscles at the top of our forearms are working all by themselves on a long-term unrelieved basis. Just try it, without the distraction of a keyboard or something you're trying to do with your hands on a keyboard or tabletop. How long can we hold our arms up and out horizontally without them starting to feel like fifty-pound weights? We start to feel the strain and tension within seconds.

Now try moving the chair back a little and sitting more forward, closer to the edge. We're not sitting for relaxed comfort now, as if we were in an armchair. We are in a working position, ***pivoting our body on the forward part of the chair in order to be poised for action by our arms and hands***.

Our elbows are no longer by our side but thrust back. And the big job those muscles in our arms had to do has evaporated. The task of maintaining our forearms in a horizontal position now falls naturally to the much larger muscles higher up – in our shoulders, and even further, in the top and centre of our backs.

The piano keyboard is much wider, of course, than a computer keyboard, so in order to balance ourselves, and not fall off the bench when we move from one part of the keyboard to another, it's necessary to balance ourselves by putting one leg – the right one most of the time – forward and the other one back. We're actually *pivoting* our bodies in this way, the chair becoming a fulcrum rather than a chair. That's why piano benches are just that – *benches*, rather than chairs with backs.

This is a very comfortable and secure position for our bodies, and there's an added advantage in that our backs are stretched out straight. In the normal armchair-style sitting position this is not the case at all: when sitting normally, our backs are curved, the vertebrae pressing down on one another, and our shoulders are hunched – very bad.

With the computer keyboard it's not necessary to adopt this poised position for our legs – a little bit like a tiger getting ready to pounce. It doesn't hurt, and may even make us feel more secure and perhaps more relaxed, but it's not necessary in order to avoid strain. Sitting forward towards the edge of the seat, however, is definitely better in any activity where we are using our hands assiduously, as they are not impeded by the extra strain of holding up our arms. Also, by this means, our back can be stretched out straight, and can lend reserves of support to our forearms and hands.

*The great Vladimir Horowitz in classic piano playing posture.
No one ever did it better than him. He never became slack about maintaining
an unfailingly ramrod-straight back and forward-leaning torso.
This is not necessary for computer typing, however sitting forward,
with a straight back, is always helpful when we're working on a table top or
keyboard with our hands over an extended period of time*

13. Violinists, cellists, guitarists, sculptors, painters, writers, carpenters, dentists, surgeons, architects, designers, golfers, tennis players, hairdressers, dress-makers and everyone else using an instrument or implement of any kind that is gripped on a constant basis, including mobile phones

One word to ALL of you: ***THUMB***. Bend it. Curve it. Flex it. Whatever you call it. Just make sure it isn't straight. This cannot be stressed enough. If the thumb is straight, that means it is automatically tightening and straining – injuriously.

Not only itself, at its base – i.e. where it connects to the palm of the hand – but also all the muscles, tendons and nerves at the base of the other fingers – especially the index finger, its nearest neighbour, upon which it more often than not presses when it is rigid, as well as its own base – the side of the wrist – and the long muscles going up the inner side of the forearm.

Just make sure it's bent. Just slightly bent is enough. It will be loose if it's bent, and the whole hand will be loose.

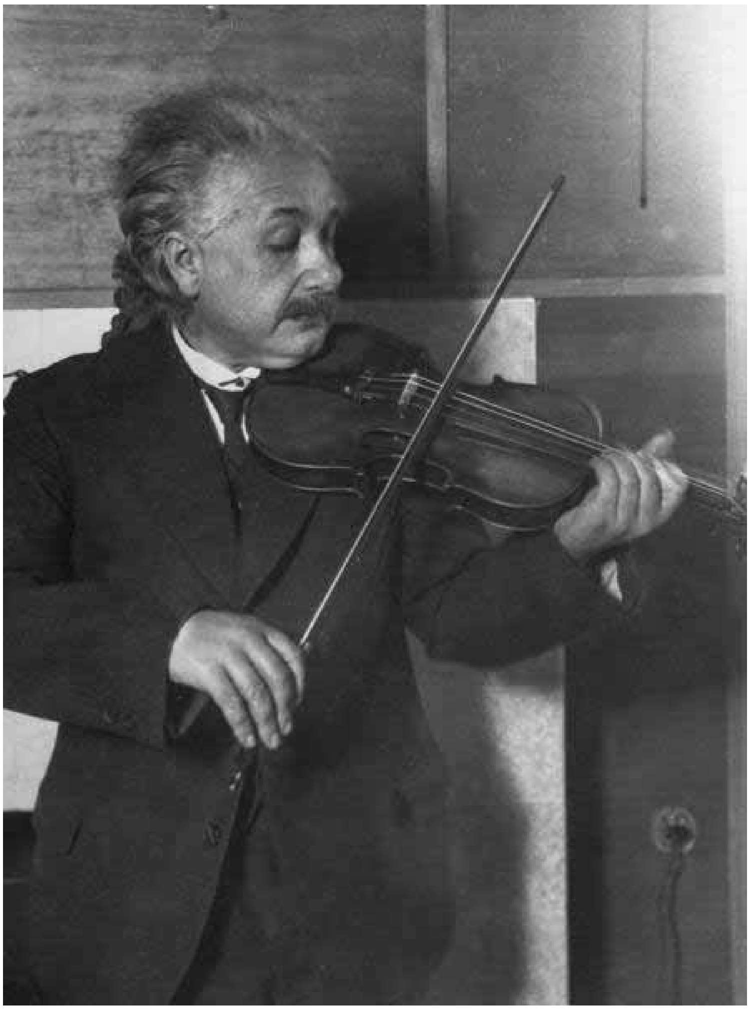
The trouble is, the thumb has a tendency to straighten unless we watch it ***all the time***. It's partly because of laziness on the thumb's part – it's easier for it to simply follow the leader with the other fingers. As we know, the other fingers are designed to point in a *forward* direction – unlike the thumb, which is entirely constructed to ***oppose***, i.e. move sideways and *only* sideways.

This tendency to straighten is also partly forced on the thumb by the need to grasp implements with pressure – the thumb can indeed seem to be able to exert more pressure when it is straight, but it is being injured when it does this over any protracted time. Or *repetitively*. As we have observed, it even almost bends *backwards* at such times. And it certainly wasn't designed to bend backwards.

We need to watch the thumb vigilantly, at least until it gets into the habit of hanging loose and bent all the time whenever we work with it. It cannot be loose if it isn't bent.

One might say bend it like Michelangelo, however the self-portrait of the artist shows his hand not *quite* at rest. His fingers are curved, and the thumb is hanging nicely away from the rest of the hand, but his thumb isn't bent. His hand is in a natural enough position to be resting, but if he were about to pick up his paintbrush his thumb would need to ***flex***.

If we're going to avoid tendinitis and other forms of RSI, we must keep our mind on our thumb as much as we possibly can. Surgical instruments, golf clubs, gardening tools, carpentry tools, scissors, pens, the necks of musical stringed instruments: all of these must be held loosely and with a ***flexed, i.e. gently curving inward, thumb***.



Albert has got the position of the right hand perfectly – it's hanging perfectly loosely, like a dog's paw when you lift his arm, with absolutely no stress at all. In this position the fingers are all curved gently but definitely; this is the same position the hand should be in when using a computer mouse. Imagine what Albert could have done with a mouse and computer! But then, he said that "imagination is more important than knowledge."

On the other hand, the position of his left hand is not quite right: the four fingers are curved correctly, in their 'natural' position, but the thumb – 'opposing' the other fingers and thereby allowing him to hold the neck of the instrument – is straight. If it is straight it is rigid, and if one practises for hours like this one will strain the side of the wrist and eventually, slowly but surely, develop carpal tunnel syndrome.

14. If you really just want to play the piano

On the computer keyboard a lot of us can actually get away with "hunt-and-peck" style typing – using the index finger of each hand. It's not very professional, but a lot of people can manage quite happily, especially if they are using the computer for assorted tasks other than professional typing.

As we know, with 'hunt-and-peck' typing our hands fall automatically into their ideal position for work – their *natural* position. The hands flop loosely from the wrist; the thumbs are gently flexed, falling away from the plane of the other four fingers; the index finger – which is the only one which makes contact with the keyboard – is curved and has all the strength of the hand as support behind it. We instantly fall into a pattern of using our hand as if knocking on a door, or tapping on a table.

It is when we are typing fast that we must watch and think about the way our hands are positioned – the gentle curve of the fingers and the disconnection of the thumb. We must actively make our hands stay in this door-knocking table-tapping position – because if we *don't* think about it then it will simply move away from this natural position: the fingers will straighten, becoming somewhat rigid in the process. Straight and rigid is the enemy.

On the piano, however, hunt-and-peck won't get us very far. We have to use *all* the fingers if we want to play anything other than *Chopsticks*. (*Chopsticks*, by the way, *is* played hunt-and-peck style: play it and you'll see the perfect position of the hand. It is, in fact, almost impossible to play it any other way; play it over and over for twenty-four hours and you may annoy the neighbours, but you won't tire your hands or incur any kind of strain. It will even feel liberating, the way driving does for many people: when driving, our hands rest lightly on the steering wheel in this same loose, door-knocking mode).

So when we play the piano we simply must get the hand position right. Not many of us do, however, and in the long run there are many who fall by the wayside.

When a musical and eager child of seven or eight begins to take piano lessons he or she usually –nearly always in fact – gets the placement of the hands and the fingers perfect right away, naturally by instinct, without having to be told anything. Within a few weeks or months, that child is usually playing Mozart rather well, with a Mozartian touch that's often difficult for adults to achieve.

Problems usually start developing around the age of thirteen, and continue through the teen years. By the late teens, many drop out and never play again. Those who have their heart set on pursuing a musical career will persist and try very hard to ignore the developing problems, but these become embedded and slowly wear away at the young pianist's musculature. (Remember, pianists are the ones who knew about carpal tunnel syndrome before anyone else had ever heard of it.)

The main troublemaker is the need to play chords, or rather, chordal harmonies.

On the computer keyboard, no matter how fast we can type, it's always one key at a time, with an occasional ctrl-alt-delete or 'shift' to break up the flow, but they are few and far between in the overall scheme of things.

On the piano, however, the harder the pieces we play, the more complex the accompaniments in the left hand as well as the multiples of notes required to be played at the same time by both hands.

What happens when we play a chordal accompaniment to a melody, if we haven't been conditioned by years of thought and practice to watching our hands to make sure that their 'natural' position is maintained at all times?

In most cases, an ingénue will allow his hand to become ***fixed in a set position***. Instead of using the fingers individually – as a typist does, or a young pianist playing Mozart – he or she unthinkingly allows the hand to start operating clumsily like a paw. It finds the chord and then clumps the hand down on it, instead of playing the three or four notes of the chord *as individual notes*.

What happens next is the hand remains in this fixed position and clumps about by twisting and turning, or by small rotations. We can see this very clearly with many Blues pianists or singers accompanying themselves, especially when they try to make the chord reverberate by tremolo-ing it. They twist their whole hand from side to side, a little like Fred Astaire or Gene Kelly waving a straw hat.

These popular-music pianists are seemingly unaware that unlike Fred or Gene, who were loose as loose could be, their hands have become fixed and rigid. Fred and Gene were shaking their hands from the wrist, but most of these pianists have tightened all the long muscles extending from the hand through the wrist, and the wrist is just as fixed as the hand is on the chord. These pianists are in fact shaking, or moving, their hand from the forearm. Carpal tunnel problems on the way soon.

Another crucial element is playing the piano well (this is huge: the old elephant in the drawing room), and being able to *continue* playing it, is the correct management of the thumb, i.e. everything that has been said about the thumb in the course of this short hand-book. A considerable number of pianists have developed supposedly mysterious problems in their thumbs, and these sometimes become debilitating enough to temporarily or permanently halt their careers.

The importance of the thumb's looseness, flexion and disconnection from the rest of the hand – i.e. it should hang away from the hand as much as possible – cannot be over-emphasised.

Thumb flexed and hanging loosely away from the hand
a couple of inches away from, and below, its nearest neighbour, the index finger;
index finger raised slightly, but it's not going to stay there long –
it will come down to a gently curved position, resting on the surface
of the keys, and remain there until the next time it has to do something

15. Just because it's so beautiful

16. Questions most often asked

What is RSI?

Repetitive Strain Injury refers to the physical injury we do to our bodies through constant repetition of certain straining movements, and – by the sheer weight of attrition caused by the repetition of these movements – injurious.

How do we get it?

RSI includes all problems arising from repetitive patterns of movement demanded of our bodies, especially our limbs. Many sports injuries are a result of constant repetition of damaging movements. Shoulder injuries are sustained by people who lift and carry heavy objects for a living – porters, baggage handlers, etc. However, the vast majority of cases these days are caused by constant use of the *hands* in repetitive movement patterns required by computer keyboards, mouses and various instruments and implements which require finger movements. Hence RSI has come to refer to the injuries sustained through incorrect use of our hands, and these injuries are ultimately reflected in the wrist.

How can we avoid it?

Not through relaxation. Relaxation simply means we put off injuring our hands until we go to work and start doing the action or actions which caused and will continue to cause the problems. The only way to avoid RSI is by using our hands *correctly*, adopting patterns of movement which are unstrained and 'natural', i.e. in accordance with the natural design of our hands.

How can we cure it?

Also not through relaxation. Relaxation means we take time out from injuring ourselves by not doing the thing which is causing us the problem. The respite is temporary, and it doesn't fix the damage which has been done. We have to give a physical injury time, often months – muscles as with bones – to repair itself. And our body can only do this if it is not being subjected to the same regimen which caused the injury, in the same way a broken arm must be immobilized and given time to repair itself. The only way to cure RSI is to rest it, and then by learning to use our hands correctly – adopting patterns of movement which are unstrained and in accordance with the natural design of our hands. After a long period of using our hands properly, the injuries we have already sustained will in time become ameliorated and hopefully the body will repair itself. The amount of time depends upon how much damage has already been done.

What can we do to improve our workplace situation?

Very little, as computer keyboards, mouses, tools, instruments and implements of all kinds are what they are. The only real thing we can do about our workplace is modify our seating arrangements so that at least our posture can be correct, or the most conducive possible to successful use of our hands.

Which is worse – keyboard or mouse?

Depends which you use more. Graphic designers and architects often suffer more from mouses, and don't think anything of keyboards, which they hardly use at all, and when they do it's usually the single-finger approach, which is non-straining. Overall, the mouse is probably the bigger culprit, because we all use the mouse constantly, whatever our level of typing skill.

Does relaxation help?

Only in as far as you might forget about the problem for a little while, if you haven't already reached the stage of numbness and tingling. Of course, you aren't doing yourself any *further* harm while you're relaxing, so 'relaxation' in this context, really just means abstaining from continued damage.

What exercises can we do?

Mental ones and *only* mental ones – in the sense of changing and monitoring our perspective on the way we use our hands. Physical actions gone wrong are *exactly* what got us here in the first place. We need to accustom ourselves to new patterns of movement, and that's a question of mind-body co-ordination. The objective is to find new ways of holding our hands and fingers such that they won't fight against the natural design and purposes for which they were intended.

Are ergonomic keyboards or mouses truly beneficial?

Very rarely. Many alternatives to the standard models are available, but their odd and often eccentric designs are more often than not stabs in the dark. They're a little bit like the baffles, or mushroom clouds suspended from the ceilings of concert halls whose design doesn't allow for good natural acoustics. They are usually a quick fix – or more accurately, an *attempt* at a fix – which most often doesn't fix very much. Nevertheless, the general principle behind ergonomic designs is a sound one (as is the basic principle behind sound reflectors). They are all attempting to avoid the *rigidity* enforced upon our hands, arms and bodies by the devices and workplace situations which cause us all the trouble.

What about keyboard rests, pads, or other accessories?

Raising the back of the keyboard so that it tilts at an angle may help, in that the hands will fall more naturally into a position where the fingers are gently curved and the thumb hangs away from the other fingers as it should. Wrist pads can ease the strain on our arms, but it doesn't resolve the situation. The ***Kogo Mouse Cover*** is the only effective aid which will improve the condition of the hand over time and engender a natural position of the hand and fingers at all times while using the mouse. For both right- and left-handed users.

What would you rather be doing instead of using the computer keyboard and mouse freely and easily in such a way that you feel completely light and relaxed?

Playing the piano.

Good luck!

About the artist

Portrait of Michelangelo, 1535, when the artist was sixty years old.
In the Casa Buonarroti, this portrait, traditionally attributed to Marcello Venusti (c.1512 – 79), is derived from a portrait of Michelangelo by Jacopino del Conte, and has been part of the Buonarroti family collection for centuries

Sculptor, painter, architect, poet, Michelangelo stands beside Leonardo, the two of them the quintessential Renaissance artists. Both had a profound preoccupation with the human form, Leonardo making celebrated scientific anatomical diagrams. Michelangelo's output in this regard was also superhumanly prodigious, most of his energies being devoted to the representation of the male form in varying states of exertion.

Michelangelo's extraordinary focus on humanity in a condition of struggle, as well as the overarching element of architectural grandeur, inevitably draw comparison with Beethoven. The output of each artist was phenomenal, but almost more powerful than their work was their unparalleled influence on the course and development of Western art and culture. The similarities are uncanny. Both were enormously proud, and resistant to pressure of any kind from patrons; Michelangelo's contemporaries spoke of his *terribilità*, which means 'awesomeness'. Michelangelo and Beethoven were similarly awesome in the scope of their conceptions and their imagination, and above all in their perception of the spiritual significance of art and beauty, and of the Divinity therein. In their view, this is how God communicates Himself to humanity.

Born Michelangelo di Lodovico Buonarroti Simoni in 1475 at Caprese, in the Republic of Florence, the son of a local magistrate, the artist believed himself to be descended from minor Florentine aristocracy. There is not a great deal of real evidence for this, though the family Buonarroti Simoni is mentioned in the Florentine chronicles as early as the XII century. This belief was perhaps partly responsible for Michelangelo's extraordinary independence of spirit and resistance to any kind of coercion from patrons. Michelangelo's lack of concern for anyone's opinion of him was in a class of its own. His whole life revolved around his work, and he never dressed or cultivated social graces of any kind to suit anyone. Immensely proud and ambitious, phenomenally energetic and amazingly sure of himself, his own opinion of his worth was a force of nature.

In 1488, at the age of thirteen, Michelangelo entered the workshop of Domenico Ghirlandaio, and thereby came under the influence of Masaccio, the first great painter of the Italian Renaissance, who had flourished in the early part of that century. Within a year, however, the young apprentice moved to the academy set up by Lorenzo the Magnificent. He lived for three years in the Palazzo Medici, where he came in contact with the humanists and writers of the Medici circle.

This period came to an end with the death of Lorenzo in 1492, followed by the ineffective rule of his son Piero the Fatuous, and the expulsion two years later of the Medici family from Florence. After the brief ascendancy of the hellfire-and-brimstone priest Girolamo Savonarola, whose ascetic brand of religion and fierce republican ideas influenced him deeply, Michelangelo left Florence for Venice and then Bologna. His departure was forced by the onset of troubled times and the loss of his patronage, but Michelangelo was eager for fame and fortune. His heart, however, would always remain in Florence. In 1496, the 22-year-old arrived in Rome, where he was to stay for five years. His first commission was to create an imitation antique sculpture of ***Bacchus***, since lost. As a result of this, however, he was commissioned by a prominent cardinal to carve the ***Pièta***, one of the most sublime creations of all time. He was then just 24.

Returning to Florence in 1501, now famous, the young sculptor was commissioned by the new republican government to carve a colossal ***David***, also in marble, as a symbol of the city's independence and resistance to tyranny. This choice was intended to reflect the power and determination of Republican Florence, which was under constant attack from supporters of the usurped Medicis. Completed in 1504, the statue stands over fourteen feet in height. It stood outside the Palazzo Vecchio for three and a half centuries, but in the 19th century it was moved to the Accademia.

Upon completion of the *David*, the Signoria of Florence commissioned both Michelangelo and Leonardo to paint the walls of the Grand Council Chamber in the Palazzo Vecchio, the seat of government of Florence. Leonardo worked on ***The Battle of Anghiari***, his young rival ***The Battle of Cascina***. Florence was divided into two camps passionately supporting one or the other. Michelangelo's work did not advance beyond the 'cartoon' (*i.e. a full-size drawing for a fresco, oil, mosaic, stained glass or tapestry*) for the painting. Leonardo's painting would be destroyed in the civil strife of 1512.

The Signoria soon released Michelangelo from his Palazzo Vecchio contract, in 1505, to comply with the wishes of the new pope, Julius II, who wanted Michelangelo back in Rome, specifically to execute a grandiose tomb for himself, with forty life-size or larger figures. The tomb would never be carried out as originally planned, though the project was to dominate over forty years of Michelangelo's life, and cause much frustration, the constantly interrupted work ending only in 1547, five revised contracts later. Only three of the original forty figures were made – ***Moses***, ***The Rebellious Slave*** (which remained unfinished), and ***The Dying Slave***. Two other figures, ***Victory*** and ***Crouching Boy***, were also made for the tomb, which is in the church of San Pietro in Vincoli, Rome.

In 1508, the pope suddenly transferred his protégé to paint the ceiling of the Sistine Chapel, an idea Michelangelo resisted, and a project that would occupy him for four back-breaking years, but it would immediately and forever more become one of the wonders of the world.

The Sistine Chapel had been built in the 1470s by Julius' uncle, Sixtus IV, and named after him. Under his uncle's papacy, Julius had led an army into Umbria to extend the temporal reach of the Papal States, and he also had designs on Venice and France, which threatened Italy and invaded in 1494. Julius had made no secret of his desire to become pope himself. Having fathered three illegitimate daughters was hardly an impediment to his ambition – Sixtus' successor, Innocent VIII, had fathered sixteen children, and his successor, the scandalously corrupt Alexander VI, was the father of Cesare and Lucrezia Borgia, both key protagonists in the politics of the Papal States. Pope Julius would turn out to be the greatest builder and patron of the arts Rome had seen since the Caesars, and by personality a match for Michelangelo. Julius also engaged Raphael to paint the Vatican apartments, and Donato Bramante to work on St. Peter's.

Michelangelo accepted the commission for the Sistine Chapel, however right from the start he made it clear he considered Julius' plans too simple. It was unheard of for a patron to allow his plans to be completely changed by an artist. Moreover, in this case, the change of plan meant that the work would have an entirely different meaning to that of the original idea.

Since he felt unfamiliar with the technique of *fresco*, Michelangelo sought the advice and help of several Florentine painters. But his desire to produce a work that would be absolutely exceptional made it almost impossible for him to work with others, and in the end he virtually did the whole thing himself – an unprecedented and unparalleled feat. Not only was the work so vast in scale, no artist had ever undertaken a whole cycle of frescoes without the support of an efficient team of helpers, *fresc*o being such a difficult medium, in which one has to race against the clock as the plaster dries.

Michelangelo complained of the enormous difficulties of the project, and in his sonnet ***On the Painting of the Sistine Chapel***, described the discomforts involved in painting a ceiling, how he hated the place, and despaired of being a painter at all.

An aide to Michelangelo on the Sistine Chapel project, Jacopo l'Indaco, has left an illuminating account of the saga:

“At first, Michelangelo thought the Pope was summoning him to tell him to continue with the statues for his tomb. He fancied himself a sculptor above all else and was very disappointed when the funding ran out for the project and the church abandoned the sculpture. Michelangelo had spent a year on the gigantic bronze, which was soon melted for cannon. But the Pope didn’t want to talk about that project – he had a new one in mind for Michelangelo: a huge fresco painting for the ceiling of the Sistine Chapel.

“Then the arguments started. Michelangelo didn't want the project because he knew it was an impossible task and one that would require him to forgo his true love, sculpting. Eventually, the pope wore him down and he gave in.

“The Sistine Chapel measures 40 by 130 feet with the centre of the curved ceiling more than 60 feet above the floor. The ceiling occupies more than 5000 square feet. The first thing that Michelangelo had to confront was how to get to the ceiling to paint it. The papal architect, Donato Bramante, was brought in to solve the problem. Bramante built a scaffold that was suspended from the ceiling from ropes. When Michelangelo saw it, he was convinced that Bramante was trying to discredit him in the eyes of the pope because he knew that when the scaffolding was removed it would leave holes in the ceiling and ruin the painting. So Michelangelo took down Bramante's scaffold and made plans for his own. When finished at the end of July, 1508, the scaffold was a flat wooden platform on brackets built out from the wall, high up near the top of the windows. A series of zigzag ladders allowed getting up and down from the platform. Michelangelo was now ready to paint.

“But it wasn’t going to be so easy. Michelangelo decided to send to Florence for some painters he knew to assist him with the huge job. But he found the quality of their work to be lacking and locked them out of the chapel and refused to let them back in. He continued to work on the ceiling with only workers to carry materials and equipment up the ladders to the scaffold such as lime, sand and water for the plaster, trowels for applying it, and brushes, paint, and paint pots. I, of course, was his head assistant and was given the honour of applying the plaster each day for Michelangelo to paint.

“There was one more major setback before the work could progress. The first layer of plaster began to mould because it was too wet. So Michelangelo had to remove it and start again. Then our group got into the everyday routine that would proceed for the next four years. Each morning, I would apply a thin layer of a special plaster called “*intomaco*” to the area of the ceiling which was to be painted that day. Next, the “cartoon”, or drawing, was secured in place and the design transferred to the wet plaster by scoring along the lines with a hard slate point. Before the plaster was dry, Michelangelo would apply the basic colours using a thick brush. The outline was repainted, then darker tones were added for shading, and white was added to create highlights.

“Instead of the original twelve figures of the apostles that the pope had suggested for the ceiling, Michelangelo painted more than 3000 figures. At the centre of the ceiling you can see the nine paintings that illustrate the Old Testament stories of the Creation and Noah.”

Starting at the back, above the altar, are the Separation of Light from Darkness, Creation of the Stars, Separation of the Land from the Waters, Creation of Adam, Creation of Eve, the Fall of Man, Noah's Sacrifice, the Flood, and the Drunkenness of Noah.

After the death of Julius in 1513, the next two popes, both Medicis, Leo X (1513-21), Lorenzo de Medici's son, and Clement VII (1523-34) preferred to keep Michelangelo away from Rome and from the tomb of Julius, so that he could work on the façade of the Medici family's parish church in Florence, San Lorenzo. This work, for which Michelangelo labored for three years in extracting the necessary marble from the quarries, was aborted too, but he was able to fulfill some of his architectural and sculptural projects in the Laurentian Library, an annex to San Lorenzo, and the New Sacristy, or Medici Chapel, of San Lorenzo.

The design of the Laurentian Library marked the beginning of what was to become the climax of Michelangelo's career – the virtual re-invention of architecture, through the combination of classical principles with the grandeur and energy of his sculpture. The Chapel was almost completed – two of the intended tombs, ***Tomb of Giuliano de Medici*** and ***Tomb of Lorenzo de Medici*** (*Lorenzo II*), were installed, and for the third, Michelangelo had carved his last great Madonna (left unfinished) when he left Florence forever in 1534.

During this period, while he was planning the tombs in the Medici Chapel, Rome was sacked, in 1527. When Florence was besieged shortly afterwards, Michelangelo helped to fortify the city, which was eventually restored to the Medicis in 1530. During the siege, Michelangelo left for a while in order to look after his own property, thereby incurring the displeasure of Alessandro de Medici. Alessandro's murder by Lorenzino in 1537 was commemorated by Michelangelo in his bust of ***Brutus***.

Nearing sixty, Michelangelo settled finally in Rome in 1534, and he was to remain there for the rest of his life – another thirty years – despite invitations from Cosimo Medici in Florence. The new Pope, Paul III, a Farnese, confirmed the commission that Clement VII had already given him for a large fresco of ***The Last Judgment*** behind the altar of the Sistine Chapel. Twenty eventful years had passed since Michelangelo had painted the ceiling of the Chapel. Far from being an extension of the earlier work, *The Last Judgement* was something entirely new. The mood of *The Last Judgment* is sombre – the figure of Christ is not a figure of consolation, and even the Saved struggle painfully towards Salvation. The work was unveiled in 1541. Michelangelo's last paintings were the frescos of the Cappella Paolina, beside the Sistine Chapel, completed in 1550, when he was 75, ***The Conversion of Paul*** and ***The Crucifixion of St. Peter***.

The crowning achievement of Michelangelo's career, however, was to be in the field of architecture. In 1537 he was commissioned to reshape the top of Rome's Capitoline Hill, known as ***Campidoglio***, Although this project wasn't completed until long after his death, it was carried out essentially as he had designed it. Then, in 1546, Michelangelo was appointed architect of ***St. Peter's***. The cathedral was constructed according to Donato Bramante's plan, but Michelangelo was ultimately responsible for its dome and for the altar end of the building on the exterior.

Continuing in his last years to write poetry, Michelangelo also carved two extraordinarily haunting Piètas, one of which, ***The Rondanini Pièta*** in Milan, he was working on six days before his death at the age of nearly eighty-nine, in February 1564. According to his wish, he was buried in Florence.

Michelangelo's prestige stands very high today, as it did in his own time, but he was out of favour for quite some time, especially in the 17^{th} century, mainly because of a general preference for the more svelte works of Raphael, Correggio and Titian. With the early Romantics in England, and the return to the Gothic, Michelangelo made a huge comeback. In the 20^{th} century, his later, unfinished, unresolved creations evoked especially great interest.

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About the author

A dramatic car crash at the age of 21 which left him with four broken bones in his right hand at the start of his pianistic career is one of the reasons Alan Kogosowski has developed a unique understanding of the physiological processes of the hand.

This traumatic event inspired Kogosowski to work as hard as he could to not only recover full mobility of his hand, but to understand its inner workings in such a way that he could master all the intricacies of the Romantic virtuoso piano repertoire of Chopin, Liszt and Rachmaninoff, and not be limited in any way in bringing out all the beauties and nuances therein.

Another reason for Kogosowski's understanding of the physiology of the hand and arms is his lifelong dedication to this wonderful music, beginning at the age of six, and continuing through his teens with a passionate exploration of this repertoire, practising on average eight – ten hours every day of his youth. After winning numerous scholarships and awards, and touring the world at age 14, at which time the young pianist was invited by Ed Sullivan to perform Chopin on his legendary television show in America, Kogosowski was awarded one of the inaugural Winston Churchill Memorial Fellowships, being the youngest recipient of this prestigious award. This grant enabled him to pursue his studies in Paris and London. Later studies followed in Warsaw, birthplace of Chopin.

Kogosowski had a mission in the initial years of study in Europe, aged 18 – 20. He was determined to find the answers to the problems of strain and tightening of the muscles of the hands and wrists which inevitably develop in young pianists by their mid-teens, as they graduate to harder and more strenuous repertoire, including the big Romantic concertos by Brahms, Liszt, Tchaikovsky and Rachmaninoff. The need to project as a soloist over an entire orchestra, with the intricate as well as heavier style of piano writing, comprising thick chords and double octaves, nearly always brings an unwitting forcing of the body and arms, and with it a dangerous build-up of strain. It is at this age that the pianist who is to have a life-long career must break through this barrier from natural gift to intellectual mastery of the technical as well as musical processes involved.

Kogosowski was acutely aware of the need for this transition, from gifted youngster to professional in complete command of his resources, from the age of 15, and by the time he completed his first year at Melbourne University just before his seventeenth birthday he had secured the Churchill Fellowship which was to take him overseas in search of the answers to his quest. There followed a year of travelling, from famous music academies in Philadelphia, to New York, to Paris and finally London, where he met the superlative pianist Michel Block, a protégé of Arthur Rubinstein.

Through the care and sensitive guidance of Block, Kogosowski would be able to clarify and refine all the techniques for preserving the natural physical movements which had come so easily to him as boy – movements which come automatically to all so-called 'child prodigies' but which then dissipate unless matched by an analytical approach to the physical process.

Glamorous as "studied in London, Paris and Warsaw" may sound, Michel Block once commented to his pupil that it didn't matter where one 'studied' – one could find the answers to these important questions in the Sahara desert. It was simply a matter of knowing what the questions *are*, and seeking the answers until one found the right person who could help. Though thoroughly French by nature, Michel Block was trained in the Russian tradition of piano playing, and had been a protégé of a notable practitioner of this school, Alexis Weissenberg, in Madrid, where the older pianist was living. The Russian school is the one that scrupulously maintained the 'natural' way of piano playing, incorporating unstrained physiological patterns and natural hand positions. This way of playing originated with Chopin in the first half of the 19th century and the knowledge was shared with his friend Franz Liszt, then transferred via the first great Russian pianist, Anton Rubinstein, to Russia in the 1860s, through the two great academies he founded, the St. Petersburg and Moscow Conservatories.

Alan Kogosowski had been trained from an early age by another product of this tradition, Leo Shalit, who came from Riga and had attended master classes in Moscow in the 1920s. Mr. Shalit had inculcated in the young Kogosowski the loose hanging arm described in this book, and the natural position of the hand and its 'dead-weight' drop when allowed to fall in this way. When he found Michel Block, Kogosowski was able to acquire an intellectual grasp of the natural movements he had been brought up to follow, and from there to develop an exact scientific approach to the application of the physiological processes of the hand and finger movements, in relation to the levels and nuances of sound required.

Identifying uncannily with the music of Chopin from the beginning, when he first heard it at age six, Alan Kogosowski is today one of the few pianists in the world to have truly earned the special title '*Chopinist*', in recognition of his dedication to, and understanding of, the music of the piano's greatest composer. His recreation of Chopin's last public appearance as a performer, which took place in 1848 at London's Guildhall, has been called 'one of London's great musical events.' When he repeated this programme in Chicago's Orchestra Hall, the ***Chicago Sun Times*** declared that this was '*Chopin in the hands of a master*'. Kogosowski has produced a TV series about the life and music of Frederic Chopin, in which he introduces and performs a wide cross section of the composer's key works. When first broadcast on television in America, the ***New York Times*** classed it as **'*outstanding.*'** This series is available on DVD.

A favourite of the British royal family, Kogosowski's performances of Beethoven's *Pathétique*, *Waldstein* and *Appassionata* sonatas for Princess Diana and Prince Charles at the ***Royal Academy of Arts*** was recorded by Polygram, as was his private concert for the Queen Mother at her home in St. James' Palace.

Kogosowski is also recognized as an outstanding presenter of music. For ten years he hosted a distinguished series of musical evenings in London, ***Schubertiades at Sotheby's***, with guest artists invited from around the world. He also co-ordinated and presented several important series of concerts at the Royal Academy of Arts and the Gibson Hall. In 2001, Kogosowski took up the position of Artistic Adviser to the Palm Beach Symphony in Florida.

Alan Kogosowski has contributed two outstanding additions to the piano concerto repertoire. ***Concerto Elégiaque in D minor***, his orchestration of Rachmaninoff's neglected great *Trio in D minor*, was recorded by maestro Neeme Järvi and the Detroit Symphony Orchestra, with Kogosowski himself as soloist. The recording, on the Chandos label, was named ***Best Recording of the Year*** in 1994 by the ***American Record Guide***, and continues to be a best-seller all over the world. This was followed by his reconstruction and orchestration of Chopin's unfinished ***Concerto No. 3 in A major***.

Kogosowski's special knowledge of the co-ordination of the muscles and ligaments of the hand have made him much in demand as a consultant to corporations on repetitive strain problems encountered by employees through constant work at computer keyboards. Calling on his profound understanding of the piano technique originated and developed by Chopin, Kogosowski has evolved a unique manner of helping the growing number of people afflicted by carpal tunnel syndrome. After his years of study of the anatomical aspects of piano technique, he has successfully adapted his knowledge of the correct positioning of the hands and fingers and posture at the keyboard to the prevention and remedy of this condition, which has afflicted pianists and violinists for years, but which has now come to much wider general attention.

He has taken this one step further with the creation of a special mouse attachment, known as the ***Kogo Mouse Cover***, which moulds the hand to its natural position and promotes unstrained use of the mouse over unlimited periods of time.

By the same author

Genius of the Piano - Frederic Chopin & the Art of the Piano

492 pages. A complete survey of the art of piano playing, incorporating the history of the instrument and its great practitioners, together with an in-depth examination of the physical processes of the hand, told from the perspective of Chopin's 27 Etudes, in the context of the life and times of Frederic Chopin, the greatest of all composers for the piano as a solo instrument, and the greatest innovator in the techniques by which it is played.

Available as an e-book from kogosowski.com

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208 pages. An in-depth examination of the ins and outs of piano playing, through the prism of Chopin's 27 Etudes. Only for serious students of the piano, though this is an unusual approach to piano playing, looking at it from the perspective of universal principles of hand positions and correct ('natural') use of the thumb and fingers.

Available as an e-book from kogosowski.com

Chopin - A Life to Remember (2-DVD set)

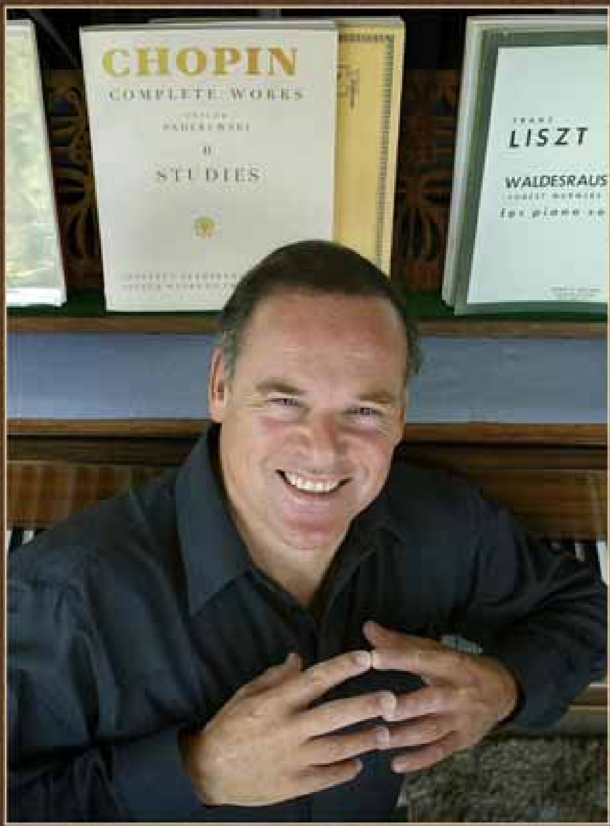
4-hr production filmed in London, with Alan Kogosowski performing over 30 of Chopin's key works, intertwined with entertaining and educational introductions about each piece of music – what to listen for musically and technically – combined with authentic imagery to create a unique Chopin Experience.

Piano Concerto No. 3, Op. 46 (Chopin, orch. Kogosowski)

A reconstruction of Frederic Chopin's unfinished third piano concerto, restored and orchestrated by Alan Kogosowski. Published by Theodore Presser Co., Philadelphia.

Concerto Elégiaque (Rachmaninoff/Kogosowski)

Orchestration of Sergei Rachmaninoff's Trio Elégiaque in D minor, Op. 9. Published by Theodore Presser Co. CD recording, Chandos 9651, available Amazon.com



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