



SOARING Rx

BY DR. DANIEL L. JOHNSON

Our Life Goal: Senescence!

Previous columns: www.tinyurl.com/drjdanscolumns

Americans have long acted as though death is something that happens to other people. My own patients are often *shocked* to discover that there are some things we can't fix with pills or surgery. "Should I see a better doctor?" they hint.

The answer is, "Yes, there are many better doctors; yet some things cannot be taken away." Many of these we do to ourselves, yet no matter how healthy we are, if we're lucky, we become old – and, at the end, decrepit.

More than one person has said to me, "Doc, getting old takes more courage than anything I've ever done."

Years ago, I had a chat with John Miller, then at 96 the oldest active commercially-rated pilot in the country. When asked how aging had affected him, he said, "I've had to adjust. Boy, have I had to adjust!"

How are *you* adjusting to your own aging?

The losses of aging are actually slow and subtle until the very end. Lack of practice is, I believe, more debilitating to skill and judgment than aging itself (get out and fly!). There are four things that erode performance:

- disease
- injury
- skipping practice
- senescence.

Today, we're going to talk mainly about senescence. I have to say that the literature of medicine and physiology is not of great help here. This is because science spends most of its effort on the minutiae of the seabed and the hydrodynamics of

wave action, and we want to understand the tide.

Deciduous Trees

Trees lose their leaves each autumn. As a child, I thought that the leaves died and then were blown off branches by the wind. It puzzled me that the white oaks and burr oaks of central Minnesota kept their brown leaves all winter (which seemed inconsiderate and ugly) while the birches and maples lost theirs before the snow fell, so that we could get the lawn raked.

The truth is that conifers also lose a full year's growth of needles each fall – but their brown needles are two years old, and this loss is obscured by retaining the present year's green new growth (except for the tamarack, in swamps, which lose their needles annually).

Decades ago, a colleague came late for hospital rounds on a still, cloudy Saturday, and said, "After breakfast I sat in my living room for a couple of hours and read a book. When I sat down, the maple tree in the yard was full of orange leaves. About 9 o'clock, leaves started to drop as if it were snowing, and by 11, the limbs were bare and there was a big circle of leaves at the foot."

This is a wonderful example of leaf senescence: a precisely regulated and timed process that shears the leaf or needle from the branch, allowing gravity to do its work.

The cellular biochemistry and genetics of this process has been pretty well worked out. An analogous process is that every hair growing from us is, on a cycle, ejected from its follicle and then new growth begins. This cycle is what limits



From full foliage to none, leaf senescence is regulated and timed.

the length of our tresses and our beards. Everyone's cycle has its own duration; everyone's maximum length is unique.

Senescence of the body in general is not quite like this, yet is just as real and



just as inevitable. I've been consciously watching people age all my life, and as a physician, for 45 years. Eventually it became clear to me that even healthy people begin at some point to fail, and if they remain healthy, it seems to take about 3 years from first generalized frailty to death.

Research on human and animal aging has shown that there are many ways to *accelerate* this (mostly, joyfully self-inflicted), and no way to prevent or delay it. Through science, our impotence against senescence has become sophisticated and nuanced.

Before senescent, debilitating decrepitude begins, aging changes bring loss of ability and resilience. It is sometimes not clear when loss is from disease and when from aging. If there's no remedy, the distinction may seem academic, though we always feel like we're standing on firmer ground if we have a well-reasoned explanation, whether factual or fictitious.

What I see is that, from one individual to another, the senescence of the vari-

ous body organs is not synchronous. In some, it's first the lungs, in others, the brain, and in still others, the heart.

Looking in the mirror, each of us can see our skin change. For nearly everyone, senescence is combined with illness and injury, exacerbating the asymmetry of loss.

The Nature of Senescence

All sorts of bad things happen – essentially nothing works well. Simply arising from bed and toddling off to the bathroom to pee at 3 am may take the athletic talent that a backward somersault once did.

In my experience, the most annoying things are that one's skin becomes paper-thin and fragile; keeping one's balance in ordinary situations becomes suspenseful; and the brain slows down in every way.

Our gut doesn't work as well. Food is incompletely digested, which colonic bacteria turn into aromatic hydrocarbons, making us all into old farts. The colon itself gets sluggish, often requiring

medical assistance.

Our parts that were elastic get stiff, and firm parts get floppy. Resilient cartilage becomes brittle and fractures. Teeth lose their moorings.

This general deterioration makes us more susceptible to disease, and if we're lucky, a serious and painless disease will then mercifully slay us. Such as pneumonia, the old man's friend, against which we vaccinate mindlessly to improve our public-health statistics.

Aging in General

Prior to these years of rapid final senescent impairment, we experience a long, almost insensible, slow diminution of powers that does not incapacitate, but to which we must adjust if we are to be safe and are to show good judgment.

This is judgment: to realistically assess ourselves, test our limits safely, and adapt to these. My view is that most skill loss is not due to aging, but to lack of repeated practice. Lack of practice has two bad outcomes: the obvious one is erosion (or evaporation) of skill. The

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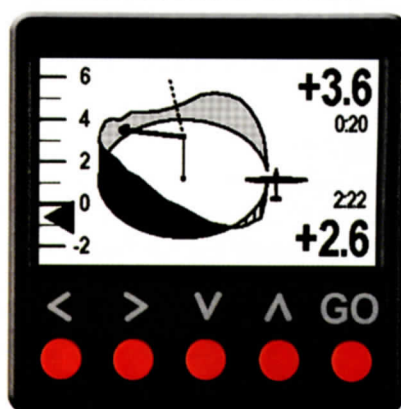


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hidden one is that we do not probe and discover our limits.

Continually Re-train

My personal universe is small, but I think it's representative. Pilots I know don't spend much time in systematic practice, with or without an instructor. I'd much rather ride with a medically impaired pilot who's been practicing regularly than a healthy one who's complacent about his skills.

Delaying Senescence

Every so often someone well-read on the Internet confidently tells me that medical research is soon going to solve the problem of aging, extending life-spans to 130 years or more.

One bad side effect of this would be freezing the seniority queue at work. Another would be extending the physical health of the decrepit 85-year-old by 45 years.

You might recall the medieval story of the young man who sold his soul to the devil for the promise that he would never die. He became old and infirm, and then discovered that he *could not* die.

The medical discoveries of the past half-century have indeed extended the adult lifespan, but the increase has been the same devil's bargain: the lives of elderly people are prolonged; healthy life is not.

No means of delaying senescence has been found.

Getting Old Faster

On the other hand, it's easy to age prematurely. I noticed when I began practice that I guessed the ages of some

women patients as being ten years older than they were – and this was as true of the 20-year-old as the 50-year-old! These were the smokers!

Research in the 1970s showed that smoking causes premature skin wrinkling and impairs fibroblast function (the cells that repair injured tissue). Research within the last decade has identified the aging proteins induced by smoking.

The Western diet seems not to promote aging so much as it causes disease: diabetes, heart disease, and cancer.

Organic hydrocarbons from crude oil derivatives impair immune function, and I am confident that there's a large collection of other harmful substances already known to biological science of which I'm unaware.

Some people become senescent later than others from genetic differences, possibly induced by generations of harsh environmental conditions. More than 60 years ago, it was shown that when laboratory rats were raised with scant food in cold conditions, average life-spans increased.

Yet, for the most part, it seems that people who age better have generally done less to hasten aging than their peers. The most important thing is to eat fruit and vegetables instead of sugar and fat. Next most important is not to inhale smoke; then, regular exercise. Then, being loved and being part of social groups.

When It's Time to Quit

My experience is that most people recognize loss of ability (sometimes all too well, mistaking lack of practice for aging losses), and adapt.

Those who do not are exceptional – yet cause a great deal of anxiety for the rest of us.

First, the people who never had very good judgment don't improve when the right stuff goes away. Sometimes they cheerfully admit to having poor judgment – and this insight does not make their decisions better.

Second, some people who've been judicious and wise lose it. The problem here is that we trust them, and their loss of judgment is invisible. A creatively brilliant person morphs into unpredictability; the attorney begins to give poor advice; the accountant forgets nuances of tax law. A respected CEO leads his company into catastrophe before anyone realizes the train is going off the rails. These things have happened many times.

This is a great challenge: to admit to ourselves that we aren't what we were; to recognize others getting simpler or less analytical – and (kindly if possible) disconnect leaders from responsibility when the problem is discovered.

Speaking of Quitting ...

This is my 60th monthly essay – five years. This seems like a nice, round number at which to draw this tradition to a close, at least for duration of this soaring season. It has been a wonderful experience, and I use the columns-trove often in my practice as educational material.

Every month I write a term paper on something about which I want to know more, that might be interesting to soaring humans, and is at least vaguely related to aviation physiology.

The problem is that this vacuums up about a week of scarce spare time each month, eating up time that might go to other priorities, including studying my own soaring topics – such as learning to use the new panel instruments, or analyzing flights, or practicing on the simulator.

I'm told that I seem humble and honest, which is genuinely an aim. I also try to be witty, but most people locally seem not to notice. Perhaps you feel that way, too. In any case, it's been a pleasant, life-enriching run. I'll soon take a leave of absence that may or may not end next fall.

Happy flying! drdan@wwt.net ✈



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