

Chapter 17  
**Beating "Boomeritis" – The FrameWork Solution**

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## **ABSTRACT**

One of the aims of this paper is to change people's way of thinking about the musculoskeletal system. Anti-aging is about longevity, it is about hormones, the skin, the heart, and the brain, but very little emphasis is ever placed on the frame, and given its importance it is about time that people considered it a little more often, and in a different way. We have had added more years to the human lifespan in the past 100 years than in the history of mankind, and that is where the mismatch occurs. It is an issue of longevity, which we are achieving, versus durability, which we are not. Evolution is not fast enough. Evolution does not work quickly enough to reinvent the musculoskeletal system in just 100 years. So, we have a major mismatch, and I believe we have outlived the warranty on our frame. This is the reason that musculoskeletal ailments are on the rise, across all age groups, and, in recent years have surpassed the common cold as the number one reason for physician office visits in the USA. Thus, the key question is now: How do you extend the warranty on your frame? And that is the other aim of this paper.

## **INTRODUCTION**

One of the aims of this paper is to change people's way of thinking about the musculoskeletal system. Anti-aging is about longevity, it is about hormones, the skin, the heart, and the brain, but very little emphasis is ever placed on the frame, and given its importance it is about time that people considered it a little more often, and in a different way.

Like the rest of the body, the musculoskeletal system changes with age. These changes create a number of issues that I refer to as Boomeritis. I am seeing Boomeritis in droves in Baby Boomers. Why? Back in 1990, the number one reason people went to the doctor in the US was for respiratory ailments, such as the common cold and asthma. However, since then, interesting things have happened. The number one reason for office visits in the US today is musculoskeletal ailments. One in seven Americans is affected by musculoskeletal ailments, and musculoskeletal conditions cost us about \$245 billion a year. So, approximately 2.5% of the Gross National Product of the US is spent on dealing with musculoskeletal ailments. Musculoskeletal ailments account for 14% of the healthcare dollar, and that is a staggering figure when you think about. The incidence of these problems is also on the rise.

We all know what has happened to the human lifespan in the last couple of hundred years. In 1796 it was 25 years, in 1896 it was 48 years, and a few years back it had almost reached 80 in the US. We have had added more years to the human lifespan in the past 100 plus years than in the history of mankind, and that is where the mismatch occurs. It is an issue of longevity, which we are achieving, versus durability, which we are not. Evolution is not fast enough to catch up in our lifetime. Evolution does not work quickly enough to reinvent the musculoskeletal system in just 100 years.

So, we have a major mismatch, and I believe we have outlived the warranty on our frame. Thus, the key question is now: How do you extend the warranty on your frame? And that is the other aim of this paper.

## **BOOMERITIS**

According to the US Census Department, in the late 1700s, half of the population of the US was under the age of 16. By 1990, a quarter of the population was under age 16. By 2025, there will be a 65-years-old for every teenager in the country. Boomeritis concerns the Baby Boomer generation, but these issues go way beyond that generation, and will be an ongoing challenge for future generations. We know who the Baby Boomers are. On January 1st 2006 the Baby Boomers started to turn 60. The countdown has started. Our aging population is partly responsible for the increase in musculoskeletal ailments over the last few years.

What other factors are responsible for this rise in musculoskeletal ailments? Firstly, there has been an increase in injury rates not only in those aged 25-64, but also in those aged 65 and over (54% increase), therefore many musculoskeletal injuries are related to an active lifestyle. Thus, although it is important to be active, it is also important to be aware that being active can create some issues. Secondly, we are living longer. Therefore we have been exposed to more different sports and activities over our lifetime. We, the boomers, are children of the "No pain, no gain" mindset. Past generations were less active, and they were less willing to put their bodies on the line. Injuries sustained in adolescence and young adulthood take their toll and have a tendency to catch up with you later on in life. A year in the life of a professional athlete, or dancer is counted like dog years – one year of a professional athletes' life is equivalent to six years of a non-professional athletes life – and athletes are pounding their bodies harder at younger and younger ages. As a result, we are seeing premature ageing of select body parts of athletes who are in their 20s and 30s.

The other reason, I think, that we are seeing an increase in musculoskeletal ailments and doctor visits for musculoskeletal ailments is that people are less willing to live with symptoms. We will do anything to turn back the clock, and that will prompt a lot of these office visits. Therefore a lot of people are showing up in physician's offices with these ailments. What we all need to do is to be better at dealing with them. To do this properly we need to start by identifying our "weak-links".

Weak links are something we all have, I believe, even a 20-year-old who is pain-free and feels great has weak links. Weak links are the biological time clocks that are going to happen, they are vulnerabilities in your frame, that at some point are going to give you a problem. A weak link could be an old injury or an ailment, or it could be musculoskeletal imbalances of strength, flexibility, or both. Some of these weak links are created when people set up a workout that is not in balance. While some can be attributed to Incomplete Rehabilitation Syndrome, which occurs when people sustain an injury and do not do enough to help rehabilitate the injured tissue, thus leaving it vulnerable. Alignment, anatomy, attitude, aging, and genetics, can all set up these weak links. Remember, a chain is only as strong as its weakest link, and thus you are likely to fail at that weakest link.

If you can identify a "weak link", then you have three good options: especially in terms of activity and exercise. You can resolve the "weak-link" (with proper evaluation, treatment and/or rehabilitation); you can toughen the "weak-link" so it is less vulnerable; or you can learn to safely work around it.

All in all, there are many things that can effect how the frame functions or how it fails. We are living longer, but we are not necessarily living stronger, therefore we have a new set of problems. The musculoskeletal tissue, just like hair and skin, goes through predictable changes as we age, and just like gray hair and wrinkles, we are all affected by these changes.

I believe that activity and exercise are important, but there is a mixed message there. We do not want people to be sedentary, but we also do not want people abusing their bodies and doing damage. Therefore it is all about finding that happy medium. Exercise should be considered a medicine, a very powerful systemic medicine. And like with any medicine, there is a dose-response curve, and there is an appropriate dose depending on what you are trying to achieve. There is also a high degree of specificity when you consider specific exercise effects, local or systemic, structural, hormonal or biochemical. Another key point here is that whilst tissue changes in the musculoskeletal system may be inevitable, problems are not, and prevention is the key. Unfortunately, most baby boomers, like our medical system, focus more on treatment rather than prevention. This is why, when I coined the term "Boomeritis", I was thinking not only about tendonitis, bursitis, and arthritis, but also "fix-me-it is" – the element of boomeritis that most reflects the boomers' attitude of fix me, turn back the clock, at any cost.

## **THE EFFECTS OF AGING ON THE MUSCULOSKELETAL SYSTEM**

The musculoskeletal system becomes more vulnerable with age and with injury. Tissues changes occur at the cellular level and the biochemical level, function decreases and vulnerability increases. As we age the incidence and severity of injury increases and healing time slows down. If we can find ways to accelerate healing of these injured parts, we would go a long way. Also, healing is not as complete in older people, and the injured tissue does not always go back to normal. All in all, when you get older healing takes much longer and unfortunately injuries do not always heal completely. Then there is the vicious cycle that when you are injured, you use that part of the body less, and it becomes weaker, stiffer, and even more vulnerable – and that is not a good thing. Being sedentary and inactive is not good for your frame.

When you look at the musculoskeletal system you have to think about its various components and what happens to it with aging. Bone constantly remodels through life. It is either growing or it is breaking down. Bone is not inert. The process of building and breaking down bone is never stagnant. Peak bone mass is reached in our 20s, so well before we reach 30, our skeleton is about strong as it going to get. After the age of 40, it is a slow process of bone loss and structural integrity loss. Osteoporosis affects both men and women, but women are clearly more affected, especially after menopause, when women can lose 3% per year if they do not do anything about it.

Bone is banked early in life and those reserves that are built become important throughout your lifetime. We know the importance of calcium, vitamin D, and exercise, and that you need to bank early and often. This is why our teenagers are in trouble. They are consuming record amounts of soft drinks, most of which contain phosphorus, which blocks calcium absorption. Therefore they are not getting enough calcium in their system, so this problem is not going away. I think we are going to see more osteoporosis related problems in future generations, not less.

Muscle mass peaks between the age of 25 and 30. There is about 10% loss per decade after the age of 40, and 15% after the age of 50. Some people who have lower levels of growth hormone and insulin-like growth factor-1 (IGF1) have even more dramatic loss of that all-important muscle, which is not only the protector of the skeleton but also of the metabolism and overall function. Muscle loss is reversible at any age and exercise is critical for that.

Tendons also weaken with age. Instead of being like a nice bungee cord, they get to be like a rubber band that has been sitting on a radiator for a year or two, they dry out and lose their elasticity, just like the skin does. In medical school we were taught about the collagen in skin, and as a child if you were told to pinch the skin on the top of your hand and let go, it dropped down immediately. If you do that to someone in their 20s, it goes down pretty quickly. If you do it to someone in their 50s, you might see that it takes its time going down. However, if you do it to someone who is elderly and you squeeze it, their skin will stay there and it will not drop down until you flatten it. That change is caused by structural changes that occur in collagen, and the collagen in the skin is the same as the collagen in the musculoskeletal system, especially your tendons. This is why tendons become more vulnerable with age, and is also why we see a lot of rotator cuff issues, Achilles tendons, tennis elbow, tendinopathy, and so on, in middle-aged and older people. The same thing happens to the ligaments and joint capsules. Again, a chain is only as strong as its weakest link. That is why you can have a big strong person who lifts weights their whole life end up with a rotator cuff injury. Their deltoids are huge and their arms are huge, but if their rotator cuff is vulnerable that is what goes, and that is what we see happen on a regular basis.

Ditto for other muscle-tendon groups. This is also why athletes taking steroids are prone to major muscle-tendon junction ruptures. The anabolic steroids build big strong muscles but actually weekend the tendons especially at the anchor point – a bad combination. They also allow a more rapid recovery from heavy workouts and increased aggression and intensity of training all of which predispose to easy overload, overuse, and injury. An example would be a professional bodybuilder who has big muscles and is training harder and harder, constantly lifting higher amounts, with less downtime for recovery between workouts. The muscle seems to handle it, and grow, but the "weak-link" cannot and the result is the all too common pec tear, biceps tear or quad tear – with a trip to the OR.

Joint surfaces, (i.e. the articular cartilage), have a very limited healing capacity. When I did my orthopedic training years ago, we were told that if you went into someone's joint and carved your initial on it, your initial would still be there twenty years later, if you looked back in with a scope. The joint surface has a very limited healing capability, and that decreases even more with age. The cells are not functioning as well, the repair cycles are longer, and their mechanical properties start to go. When this happens you start to see arthritis and degenerative wear. It is not uniform. It is not always symptomatic, and again exercise and prevention is important.

The healthy spine is composed of normal healthy discs, which are important shock absorbers. When discs degenerate, they lose their proteoglycan and water content. When that happens it is not as good a shock absorber for the spine as it should be. The nutrition of the disc is also vulnerable, and therefore vascularity is important. The disc is a very low vascular area, and that is one of the reasons why smoking, believe it or not, can affect your incidence of back pain and disc issues. If you look at asymptomatic 40 year olds (i.e. no history of back problems or symptoms), 30 or 40% of them will have these kinds of degenerative disc changes. Usually, in a given lifetime 80% of us will be knocked off our feet with a back pain episode. Along with the common cold, lower back problems are the number one reason for work absenteeism, and when you think in terms of workers compensation the impact is huge.

The point here is that while the above musculoskeletal tissue changes may be inevitable problems are not. I think we are at the point where someday these tissue changes will not be inevitable, that we will be able to halt them and possibly even reverse them, and that is the exiting part.

## **EXTENDING THE WARRANTY OF THE FRAME**

So, we are talking about durability. What can we do to make a frame that will go the distance, a frame that is build to last? How can we extend the warranty on the frame? A lot of it is about prevention. Sure, there are some hi-tech, cutting-edge things out there that may help to extend the warranty on the frame after it fails, but most of it is down to good old prevention before problems strike. In fact, I wrote the book *FrameWork – Your 7 Step Program for Healthy Muscles, Bones and Joints* (Rodale) specifically to provide a comprehensive approach to maintaining your musculoskeletal system, your frame.

FrameWork's first step is a self-test entitled "Are You Built To Last" (available on my website [www.drnick.com](http://www.drnick.com)), which is a comprehensive screening test designed to identify those vulnerable weak links in the frame.

Steps 2, 3, and 4 in FrameWork involve components of exercise that are very frame-specific. However, that does not mean any old sort of exercise, it means exercise that will protect rather than damage the frame. Thus, the type of aerobic exercise a patient should do is dependent upon their ailment, or their weak links. Aerobic exercise is important. It is not just for the heart. Aerobic exercise also protects the frame, it is good for arthritis, and it prevents back pain. When you look at people from a cardiovascular standpoint, those who are the fittest are also the least likely to have lower back problems. VO2 max is actually a better indicator of whether or not someone will suffer from lower back problems than lower back strength. Resistance exercise is also important. Having that core of muscle around the middle is vital, and powerful, pliable, limbs are about maintaining strength and flexibility. Therefore, both aerobic and resistance exercise are key in prevention, but programs need to be customized to a patients needs and their unique frames, including specific musculoskeletal elements they may have.

Step 5 involves the proper use of rest and recovery. If a patient is not incorporating appropriate active rest and recovery strategies, they are going to end up with over-training syndromes and over-use injuries. Rest and recovery is needed when you exercise, not just on a local basis, but systemically as well. There is the problem of metabolic and exercise-induced oxidative stress. The metabolic cost of pounding your body is considerable, and it is one of the reasons Lance Armstrong schedules recovery as a workout. Therefore, you need to include recovery in any exercise program, and that does not necessarily mean sitting around or lying on a couch. There are active ways to recover.

Nutrition and lifestyle choices obviously play a role in prevention and FrameWork's Step 6 details a frame-focused approach. Things like smoking, high-fat diets, and high-sugar diets, can be really damaging to the frame. Every nutritional choice you make can either help or hinder the frame's repair, recovery, and regeneration. Supplements can be of great benefit to the musculoskeletal system. The most beneficial supplements for the joints are probably glucosamine and chondroitin sulfate.

There are many studies that have demonstrated the effectiveness of glucosamine and chondroitin sulfate. About half of the people who suffer from osteoarthritis will improve if they take them – however, it does take two months for the supplements to have an effect. Therefore, with patients who are very used to quick results with NSAIDs, you have to tell them to pick a good brand and give it at least two months before you give it a thumbs up or thumbs down. The difference in the quality of brands out there is dramatic. Therefore it is important to try to use the brands that are used in the studies. I tend to use Cosamin DS because of the high quality that has consistently been shown when it is independently tested. Also, Cosamin DS is the only low molecular weight chondroitin sulfate sold in the USA. Although glucosamine and chondroitin sulfate can be used alone, they do work better in combination – there is a proven synergy.

FrameWork's Step 7 deals with the role the mind and CNS plays in maintaining a healthy frame. Mindset also plays an important role in prevention. As an orthopedic surgeon, I never would have believed that I would consider mindset to be so important. It wasn't part of my original training, which was very focused on the physical and the mechanical, and how to fix things in physical mechanical ways. But after many years in practice, I have realized how important mindset is. If you ignore the role that the mind plays, especially in the musculoskeletal system, you are going to miss the boat with a lot of your patients, as some of your patients' musculoskeletal ailments may not be entirely physical.

Stress also, when unchecked can be very damaging to the frame and inhibit recovery and healing. Pain is also an important area when it comes to frame function and failure. Chronic

musculoskeletal pain affects 50 million individuals and an additional 25 million suffer with a variety of acute pain syndromes. In the USA, \$120 billion is spent annually on pain management. We are just beginning to think differently about the importance of managing, or resolving when possible, chronic pain conditions. The power of the mind clearly is at play here, sometimes amplifying pain. Complex vicious cycles occur between pain and musculoskeletal function, leading to not only impairment but also structural deterioration and decline. Although there are many pharmaceutical interventions, the use of acupuncture and newer devices like the InterX 5000 (an interactive electrical stimulation device by Neuro Resource Group) can be very helpful in getting patients back on track and functioning.

## **THE FUTURE OF FRAME REPAIR & REGENERATION**

What happens if prevention is not enough and a patient's frame fails? Well, then there are the hi-tech options. Technology is expensive, and prevention is better, however we do have hi-tech options in the pipeline if need be. Tremendous orthopedic work is being done at present with growth factors, gene therapy, bone morphogenic proteins, biomaterials, tissue engineering, and other new modalities to try to repair and regenerate the musculoskeletal system. Nowadays, it is not just anti-aging specialists that are talking about regenerative medicine. Regenerative medicine is becoming more mainstream, and orthopedic surgeons have taken a leadership position in the research and development of these new technologies.

It is going to be interesting to look at the Olympics 15 to 20 years from now. If you think it is problematic now with doping, wait till some of the new technology is available. There was an article in Sports Illustrated in which one of the writers wrote: "in the not too distant future it should be possible to repair injured tendons, cartilages, or ligaments, with an injection. It will be like a salamander re-growing a tail." So, we are not just talking about reparative medicine anymore, which is what you get now when you go to an orthopedist office, the future is all about regenerative medicine. And regenerative medicine will clearly bring not only new opportunities, but also new challenges, including many ethical ones.

Research that is happening right now has shown that tissue engineered rotator cuffs can be made from porcine small intestine submucosa and xenotransplanted to regenerate damaged rotator cuffs. Soon growth factors will be added to speed up the process of tendon and ligament healing. There are resorbable biomaterials that can be used to create bio-scaffolds, that when used in conjunction with growth factors, should give us the power to regenerate things like torn anterior cruciate ligaments and joint surfaces.

We are already practicing regenerative medicine to some degree. I carry out chondrocyte transplants in my own practice. We currently use something called ACI, or Autologous Chondrocyte Implantation, for people who have focal areas of joint damage, which were destined to become arthritic. Remember, the limited capacity that damaged joint surfaces have to heal. ACI involves removing some of the patient's cells, growing them in tissue culture, and re-growing until we have a population of 12 million chondrocytes ready to implant back into the patient. Right now, ACI involves open surgery, with a pretty long recovery. However, that is soon likely to change. A technique called MACI (Matrix-induced Autologous Chondrocyte Implantation) has already been approved in Europe, and the US FDA is currently reviewing it for clinical trials in the USA. MACI allows you to grow chondrocytes on a little sponge like a postal stamp that you can implant into the patient through small incisions, or even through the arthroscope, and lay them right into the articular cartilage defect, thus enabling you to regenerate a joint surface. We can do this right now with ACI, but it is a big operation. Unfortunately, we are probably two or three years away from seeing MACI in the US because of regulatory issues.

There is a new technique called viscosupplementation that we are using for joints. It is something that may be a useful addition to your practice if you have a lot of patients with arthritis. Proper training is required for the injection technique because, unlike cortisone, it is vital that the injectable gets into the joint and not just the soft tissue. The technique is FDA approved for the knee, and there are numerous studies ongoing. It will probably gain approval for use in other osteoarthritic joints. Normal synovial fluid has tremendous elasticity and viscosity. With arthritis you can get an over-production of fluid, but it's a low quality fluid. It is not a quality lubricant. It is not an optimal shock absorber. It has low elasticity and low viscosity. So, the idea is that you can replace this low-quality fluid with an injection of a lubricant – Synvisc is probably the most commonly used. Many orthopedic surgeons are using it off-label to treat arthritic shoulders, hips, ankles, elbows and hands. The hip joint injection requires fluroscopy. But in the knee, which is one of the most common areas of osteoarthritis injection is easily done office-based, and

with very minimal, if any, potential side effects. Occasionally, people will get flare up. However, it is self-limiting, but otherwise there are no negative side effects that we know of. Numerous studies have showed an improvement in pain over period of time. It can last for six months. I have had some patients get a year or more of improvement. It does not cure arthritis, but it improves the function, and reduces pain and stiffness, and it is helpful because it is not tearing your stomach out or causing heart attacks like NSAIDs can. Overall, approximately 70 to 80% of patients benefit from viscosupplementation. It works across all grades of arthritis in the knee, but tends to work better in the mild to moderate categories. In my experience, less than one in four people with severe arthritis will see an improvement, and I don't think their improvement is that dramatic so, in my mind viscosupplementation is not really for bone on bone level advanced arthritis.

Other interesting treatments that are already available include: H-wave electrical stimulation of muscle and bone, the use of ultrasound to accelerate the healing of fractures, and the exogenic bone stimulator, which also accelerates fracture healing. Orthotripsy is a new technology that uses lithotripsy methods to treat chronic tendon issues and tendinopathy. The aim of this technique is to re-vascularize damaged tendons, and it is very successful for the treatment of tennis elbow, chronic heel pain, tendonitis, and tendinopathy. Even Botox is now also being used to treat chronic tendon pain as well as muscle pain. But more research is needed before I would recommend it.

Of course there are safety issues. NSAIDs are great for treating pain, but there is a musculoskeletal cost to their use. We all now know about the cardiovascular, GI, renal, and hepatic consequences of drugs like Vioxx, but we are also starting to realize that chronic use of NSAIDs may inhibit the healing and regeneration process that tendons, joint surfaces, and so on, rely upon. Therefore long-term use of NSAIDs is not a great idea. For this reason, it is a good idea to consider more local treatments, such as viscosupplementation or other natural interventions like exercise and supplements.

## **CONCLUDING REMARKS**

The musculoskeletal system is important, and perhaps it is time to think differently about it. Musculoskeletal ailments are the number one cause of doctor visits, and we are going to see this grow more and more with our aging population (especially baby boomers) and also future generations who are either too active, injured, or too sedentary. We are living longer but not really stronger. We don't have the answers for all musculoskeletal ailments an, but the future is very, very bright. The 90s were the decade of the brain, and we are now in "the bone and joint decade," where a tremendous explosion of technology and research to help "extend the warranty" our frames is underway.

These problems I have discussed are not going away anytime soon, in fact musculoskeletal ailments will become and even bigger burden to our society in this 21st century. Professionals need to step up their knowledge in this area. This does not just mean physicians; it means personal trainers, athletic trainers, and anybody who works with an aging population. Anybody whose job is to try to keep the aging population active and fit needs to know how to navigate a musculoskeletal system that is not always cooperative. This is a challenge I put out to this group, who clearly is on the cutting edge of maintaining health and function for all the years we have added, and continue to add to our lives. Remember, longevity is wonderful but without optimal functional durability, enjoyment of life will be a challenge that most of us will not want to face. I believe that with proper attention to our musculoskeletal system, our frames, this will not be the case.

## **ABOUT THE AUTHOR**

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