



TheElite Training Group track club

## Expanding the area of what is possible

In Track & Field Distance Running & Competent Self-Care in medicine and psychology

# TheETG range of motion

### TheETG Training Packets

**Mission:** Expand the area of what is possible for human performance in distance running. One of TheETG methods of achieving that is to proliferate applied science based information by way of –free– packets containing plain language info for “the average joe” seeking to move themselves or others forward

**As you continue to acquire and apply more information** you continue to expand the area of what is possible.

**The functioning of brain cells, muscle cells, blood cells, -all cells-** are governed by the laws of nature. The laws of nature -are- the underlying mechanisms of how everything works. The laws of nature that control human cellular function are -not- governed by your chosen belief system or the dogma you have been indoctrinated into, or the dogma you refuse to set aside.

“Nature, to be commanded, must be obeyed.” —[Francis Bacon]

**Data-less conclusions founded upon faulty assumptions are the mother of all screw-ups.** They lead to human belief systems that quickly get set in stone insuring that new information gets shouted down as pride, ego, and resistance to change supplant data, logic and reason. Put data ahead of dogma. Follow the data -not- the crowd.

“In God we trust...Everyone else must bring data.” —[W.Edwards Deming]

To be a good track coach one must **-first- be a good physiologist.**

To be a good medical doctor one must **-first- be a good physiologist..**

To be a good physiologist one must -first- be willing to.....

- put data ahead of dogma, follow the data -not- the crowd
- put science ahead of indoctrinated tradition
- put logic and reason ahead of faulty assumptions
- put mechanisms ahead of correlations and “risk factors”
- put critical thinking and clinical reasoning ahead of a memorized set of “if-then” statements
- read and apply large amounts of published research
- accept outcomes as the judge and jury of your work

**You may copy** any and all contents of this packet, with exception and exclusion of using such copies for purposes of producing revenue, profit, or any direct or indirect compensation.

# **Stay ahead of tissue tightening**

**The rate of tissue tightening** as your fitness level progresses in any given week/month may exceed the rate and frequency of stretching sessions and/or the effectiveness/potency of your stretching protocols [range of motion exercises = ROM's].

Issues tend to occur at times **when your fitness level is moving forward, and because your fitness level is moving forward.**

In sprinters, distance runners, etc, those issues tend to be hamstring, calf, quad, cramping & muscle strains.

Look to successfully address that. **Use Range Of Motion exercises** to stay ahead of tissue tightening.

If the level of tissue strength necessary to endure your training loads exceeds what your tissues have, the tissues that are the weakest link in the chain may require you to improve the effectiveness of your strengthening protocols or reconsider the design of your training program.

Look to successfully address that as well.



# TheETG ROM's Day

ROM's = range of motion exercises

The importance of range of motion.

This massive issue in our sport shows up --everywhere-- you look in the form of muscle spasms, cramps, micro-tears, strains, pulls too typically occurring at the worst possible time because these issues happen when things are going well. They happen when your fitness level is moving forward. Tissues tighten over time --due-- to training!!! They lose range of motion.

Once that process reaches critical mass, at some point during a warmup, a workout, a race, some sort of tissue problem or injury is all but inevitable.

The rate of tissue tightening as your fitness level progresses may exceed the rate, frequency and/or effectiveness of your stretching protocols [range of motion exercises = ROM's].

----- **The importance of range of motion**.....stay ahead of tissue tightening and tissue strength needs. Look to successfully address this.

All is lost if you don't get this done.

The rate of tissue tightening as your fitness level progresses may exceed the rate, frequency and/or effectiveness of your stretching protocols [range of motion exercises = ROM's].

Hamstrings, calves, quads....and in throwers = pecs, biceps.

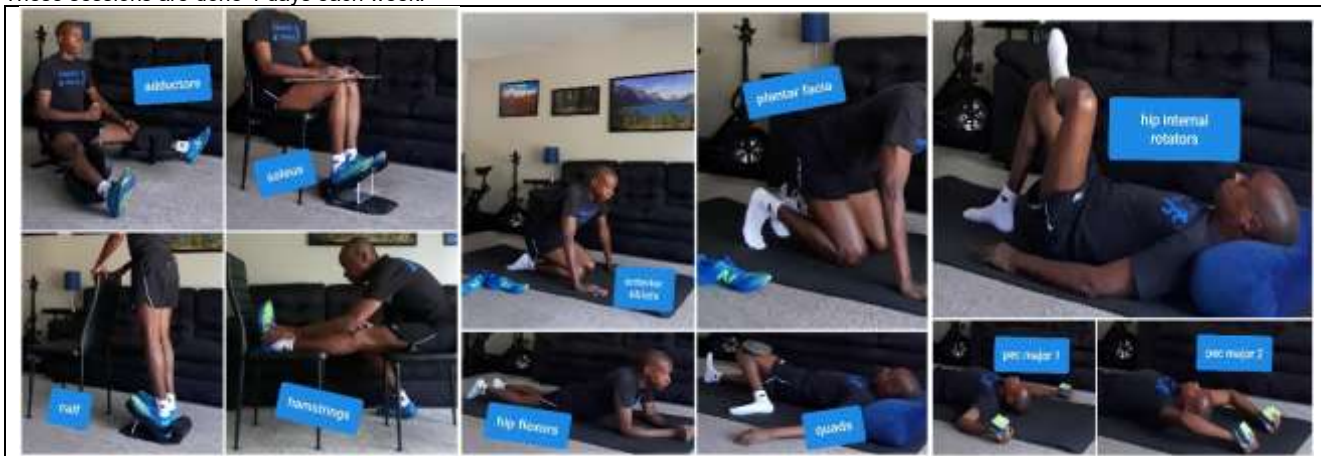
Use long hold [4 - 10 minutes] Range Of Motion exercises to stay ahead of tissue tightening.

----- **The importance of range of motion**.....range of motion impacts energy expenditure. The greater resistance to movement your tight tissues create, the greater the energy expended just to move the limbs. Add this to issues at ground contact, the loss of elastic energy in the calves, achilles, and plantar tissues, at some point that stuff adds to energy necessary to cover the same distance and time on the clock.

Just as strength training can be a stimulus for muscles and tendons to grow in width, long hold stretching such as for 4 to 10 minutes for each stretch is a stimulus for muscles and tendons to grow in length and for the nervous system to adjust, resulting in a sustained increase in range of motion. In

TheETG we don't do traditional stretching before or after workouts. We have formal stretch sessions scheduled in the training program just as we have formal track workouts, road workouts, strength training, etc scheduled in the training program.

These sessions are done 4 days each week.





# TheETG ROM's

## Supplemental Exercises on all ROM's days

5 reps -- back extensions

5 reps -- jacks

5 reps -- wall handstands

About an hour.....

### ROM's [4 – 10 minute holds]

1 – adductors

2 – soleus

3 – calf

### ROM's [4 - 10 minute holds]

4 -- plantar fascia

5 -- tibialis anterior

### ROM's [4 – 10 minute holds]

6 -- hip flexors

7 -- hamstring

8 -- quads [left]

9 -- quads [right]

10 -- hip internal rotators [left]

11 -- hip internal rotators [right]

### ROM's [4 – 10 minute holds]

12 -- pec major 1

13 -- pec major 2

"Skeletal muscle responds to passive overstretch through sarcomerogenesis, the creation and serial deposition of new sarcomere units. Sarcomerogenesis is critical to muscle function: It gradually re-positions the muscle back into its optimal operating regime."

"Striated muscle displays the striking ability to rapidly adapt to changes in physiological requirements through the dynamic assembly and disassembly of its functional building blocks, the sarcomeres."

"We have proposed, for the first time, a mechanistic multiscale model for stretch-induced sarcomerogenesis, in which chronic muscle lengthening is characterized through a scalar-valued internal variable, the serial sarcomere number."

"The ultimate goal would be to maximize stretch-induced muscle growth, such that the muscle always stays within a physiologically reasonable operating range."

"The ultimate goal would be to guarantee optimal regeneration and long-term repair durability."

**A.M.Zollner, et al**

**Stretching Skeletal Muscle: Chronic Muscle Lengthening through Sarcomerogenesis**

**PLoS One --- Volume 7 #10 -- 2012**

**National Institutes Of Health [NIH]**

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"Human skeletal muscle responds to mechanical loading by adapting its structure. Muscle structure can be described by quantifying its architectural parameters, namely fascicle length and angle, muscle thickness, and cross-sectional area, using ultrasonography. Mechanical loading induced either by muscle contraction or muscle stretching triggers alterations in cellular signaling and gene expression, which modify the physiological, structural, and contractile properties of muscle fibers."

"Skeletal muscle stretching is commonly used in sports and clinical settings, with the aim to increase maximum joint range of motion (ROM) and muscle-tendon unit extensibility."

"Increased ROM following long-term stretching interventions may be explained by increased stretch tolerance and/or changes in tissue mechanical properties, while some recent studies have found changes in muscle morphology."

"Most studies found no detectable changes in fascicle angles and muscle thickness following static stretching training, with some notable exceptions. Regarding fascicle length, an increase in resting values has been found following 6–12 weeks of stretching training, while increases in muscle fascicle length during stretching may appear earlier, i.e., after 3–4 weeks of static stretching training."

"....the conflicting results between studies can be partly attributed to differences in stretching protocols and methodologies used."

"Longer-term static stretching interventions, overloaded static stretching, and high-intensity and/or long-duration stretching bouts may be more effective in inducing changes in muscle morphology."

"To examine the effect of static stretching training on muscle architecture (i.e., fascicle length and fascicle angle, muscle thickness and cross-sectional area) in healthy participants."

"From the 2946 records retrieved, 19 studies were included in the systematic review and meta-analysis (n = 467 participants)."

"Subgroup analyses showed that fascicle length increased when high stretching volumes were used, while no changes were found for low stretching volumes...."

"High stretching intensities induced fascicle length increases, while low stretching intensities did not have an effect...."

"Also, high intensity stretching resulted in increased muscle thickness."

"Meta-regression analyses showed that longitudinal fascicle growth was positively associated with stretching volume and intensity."

Static stretching training increases fascicle length at rest and during stretching in healthy participants. High, but not low, stretching volumes and intensities induce longitudinal fascicle growth, while high stretching intensities result in increased muscle thickness.

"High volumes of static stretching and high stretching intensities are necessary to induce increases in fascicle length and muscle thickness, while fascicle angle remains unaffected by static stretching."

"These results show that long-term static stretching, using extended bouts of intense muscle elongation, may modify muscle architecture, with possible effects on muscle function. In that respect, static stretching may be used not only to increase ROM, but also to enhance muscle performance....."

**I.Panidi, et al**

**Muscle Architecture Adaptations to Static Stretching Training: A Systematic Review with Meta-Analysis**

**Sports Medicine Open -- Volume 9 -- article 47 -- 2023**

stretching vs heart disease [a.k.a. vascular disease, a.k.a blood vessel issues]

"Maintenance and enhancement of vascular endothelial function contribute to the prevention of cardiovascular disease and prolong a healthy life expectancy. Given the reversible nature of vascular endothelial function, interventions to improve this function might prevent arteriosclerosis."

"Accordingly, we studied the effects of a 6-month static stretching intervention on vascular endothelial function and arterial stiffness and investigated the reversibility of these effects after a 6-month detraining period following intervention completion."

"The study evaluated 22 healthy, non-smoking, premenopausal women aged  $\geq 40$  years. Subjects were randomly assigned to the full-intervention ( $n = 11$ ; mean age:  $48.6 \pm 2.8$  years) or a half-intervention that included a control period ( $n = 11$ ; mean age:  $46.9 \pm 3.6$  years)."

"Body flexibility and vascular endothelial function improved significantly after 3 months of static stretching."

"In addition to these improvements, arterial stiffness improved significantly after a 6-month intervention. However, after a 6-month detraining period, vascular endothelial function, flexibility, and arterial stiffness all returned to preintervention conditions, demonstrating the reversibility of the obtained effects."

"A 3-month static stretching intervention was found to improve vascular endothelial function, and an additional 3-month intervention also improved arterial stiffness. However, these effects were reversed by detraining."

## So called "performance enhancing drugs" are prescription drugs.

### Some examples of the effectiveness of prescription drugs in sport.....

"The drug erythropoietin, often called EPO.....a new systemic review of existing research reveals that **there is no scientific evidence that it does enhance performance**, but there is evidence that using it in sport could place a user's health and life at risk."  
EPO [erythropoietin] doping in elite cycling: No evidence of benefit, but risk of harm  
Science Daily.....December 5, 2012.

"....**there is no scientific basis from which to conclude that rHuEPO has performance-enhancing properties** in elite cyclists." "The use of rHuEPO in cycling is rife but scientifically unsupported by evidence, and its use in sports is medical malpractice."  
J.A.Heuberger, et al  
Erythropoietin doping in cycling: lack of evidence for efficacy and a negative risk-benefit.  
British Journal Of Clinical Pharmacology.....Volume 75 #6.....June 2013...page 1406

"The **over-exaggeration of the effects of growth hormone** in muscle building is effectively promoting its abuse...."  
"....there is the question of disinformation on rhGH....Part of this problem may, paradoxically, derive from the anti-doping authorities themselves. By ignoring the evidence the **rhGH does not work** in normal healthy subjects, the athletic establishment could be accused of effectively promoting its use."  
**"We must tell athletes the truth: growth hormone does not 'work'** or at least not as they think it does and that its is associated with all kinds of immediate and long term hazards-----everything from decreased performance to cancer."  
"....none of us scientists, doctors, coaches, or sports bodies should continue to suggest that this dangerous doping practice works."  
M.J. Rennie  
British Journal Of Sports Medicine.....Volume 37 #2....April 2003....pages 100-103

"**Testosterone prohormones** such as androstenedione, androstenediol, and dehydroepiandrosterone (DHEA) have been heavily marketed as testosterone-enhancing and muscle-building nutritional supplements for the past decade."  
"Contrary to marketing claims, research to date indicates that the use of prohormone nutritional supplements (DHEA, androstenedione, androstenediol, and other steroid hormone supplements) **does not produce either anabolic or ergogenic** effects in men. Moreover, the use of prohormone nutritional supplements may raise the risk for negative health consequences."  
G.A.Brown, et al  
Testosterone Prohormone Supplements.  
Medicine & Science in Sports & Exercise.....Volume 38 #8....August 2006.....pg 1367-1537

## So called "performance enhancing drugs" are prescription drugs.

### Some examples of the effectiveness of prescription drugs in American medicine & health care.....

"Most drugs are only effective **for a small percentage** of people who take them."  
Michael Leavitt [U.S. Secretary of Health & Human Services 2005 - 2009]

".....the benefits that US health care currently deliver **may not outweigh the aggregate health harm** it imparts."  
Journal Of The American Medical Association...Volume 302 #1..July 1, 2009...page 89 - 91

"It is estimated that more than 700,000 individuals are seen in hospital emergency departments for adverse drug events each year in the United States."  
[Centers For Disease Control.....2015]

"106,000 deaths/year **from non-error**, adverse effects of medications"  
B. Starfield  
Is US Health Really the Best in the World  
Journal of The American Medical Association.....Volume 284 #4....July 26, 2000....page 483 - 485

".....1.5 million U.S. residents are harmed or killed each year because of medication errors, according to an Institute of Medicine report."  
Nature Medicine....Volume 12 #9.....September 2006.....pg 984 - 985.....News In Brief

**Pursue becoming a**

**Master Of  
Sport**