



# WHITE PAPER 2016: Smarter Training



# The Brutal Basics...

- **TRAINING ZONES & GOALS**

Goals determine plans which should set the sessions you do.  
Elites/Top AG train 20-35h/wk & 8-18h/wk (400-1200h/year)  
But remember: **Racing teaches you the craft of racing.**

- **NUTRITION**

Correct diet + the right sports nutrition products = better gains  
e.g. low glycogen sessions; protein timing; L-Carnitine augmentation  
**Personalised nutrition programmes are the new marginal gains**

- **EQUIPMENT**

This can improve performance through “Kit Doping” (Aston 2013)  
e.g. optimised wetsuits; drag reduction bikes/clothing, compression  
**It is developing faster than your genes (220 Science of Speed)\***

# 1st Rule of Smarter Training

## Base level must be 75-90% of time

Base level is 55-80% HRmax or in “low lactate” ZONE ONE predominates in all phases of the year:

*Coach of Ironman Cozumel '13 winner “85% base training” (2013).*

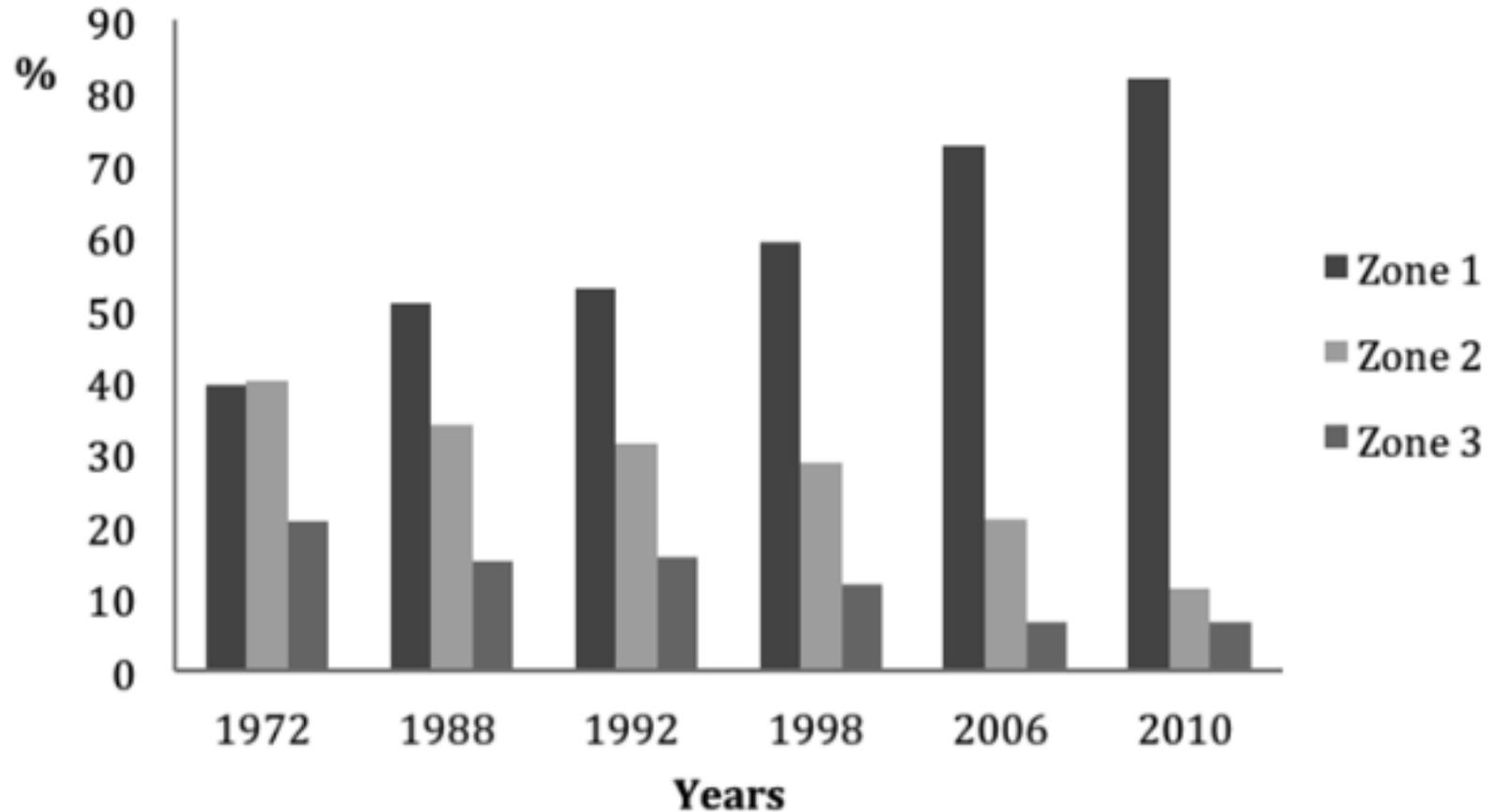
*UK OD National Squad ~70% below race pace.*

*Top 10 Olympian - Swim 74% Bike 88% Run 85% in Zone One (2012).*

# NEW EVIDENCE

Orie (2014) 38 years of Olympic Speed Skaters data

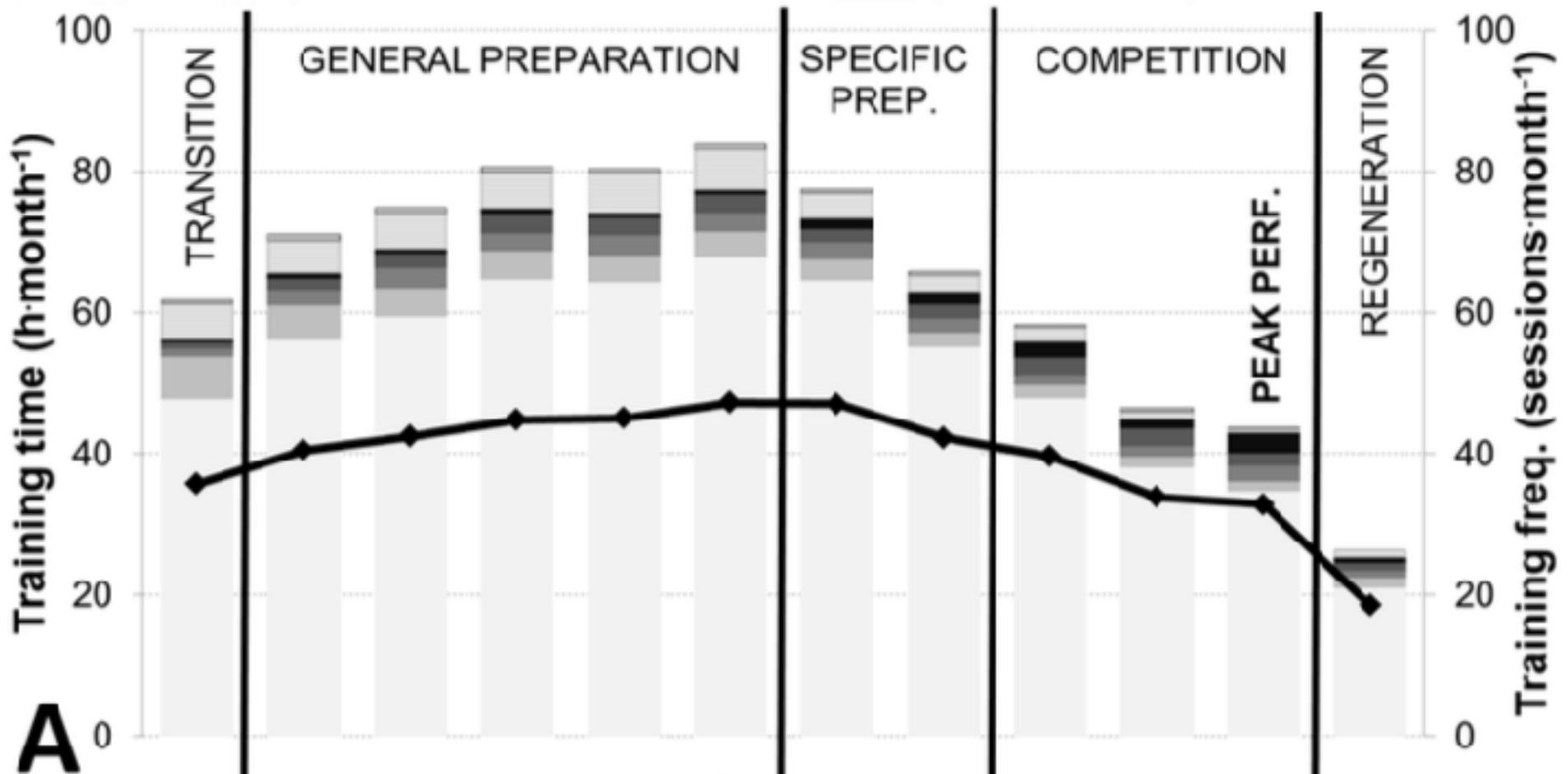
Note: Z1 volume is increasing Z2/Z3 proportions are dropping.



# NEW EVIDENCE

Tonnessean (2014) XC Ski/Biathletes “Road to Gold”

Note: the light column is ZI and it predominates, in every phase of training.

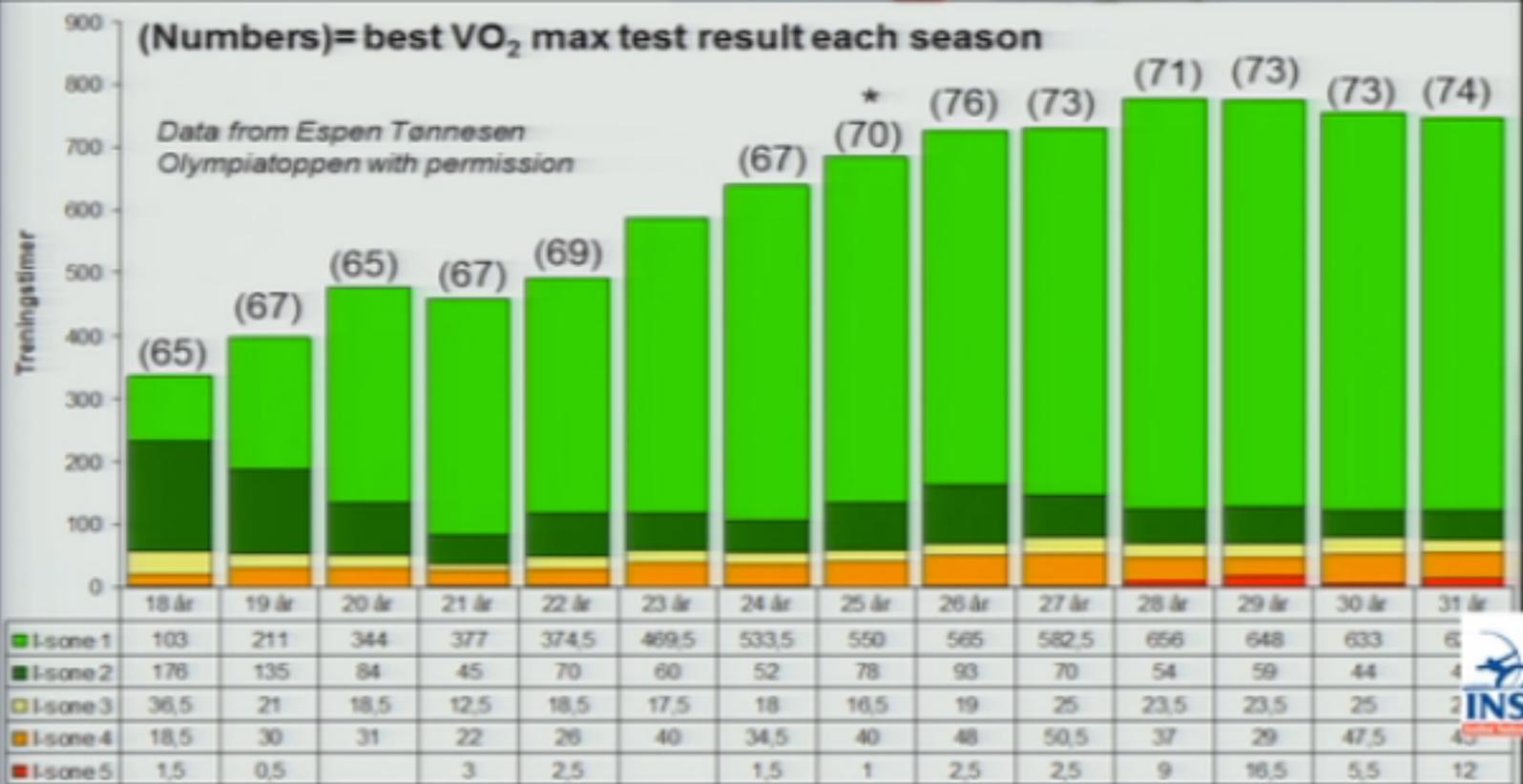


# NEW EVIDENCE

Seiler (2014 webinar)) Biathlete Training

Note: how ZI increases, volume increases and VO<sub>2</sub>max increases.

Bente Skari  
5 time World Champion,  
O-gold, 46 WC victories



# THE BIG MISTAKES

- **Going too hard too soon**

All interval studies, Elite training plans and their diaries include time to get the muscles warmed-up. Too-hard, too-soon activates “stress” response

- **Calling low Zone 2 “base” training or steady**

80%HRmax is the Zone 1 limit. Above is stressful “no-mans land” training - if you are meant to be there good, otherwise it truly is junk!

- **Not doing sessions to a plan**

It is your training so be in control of session plans, outcomes and future tweaks (route, time of day, training partners, equipment)

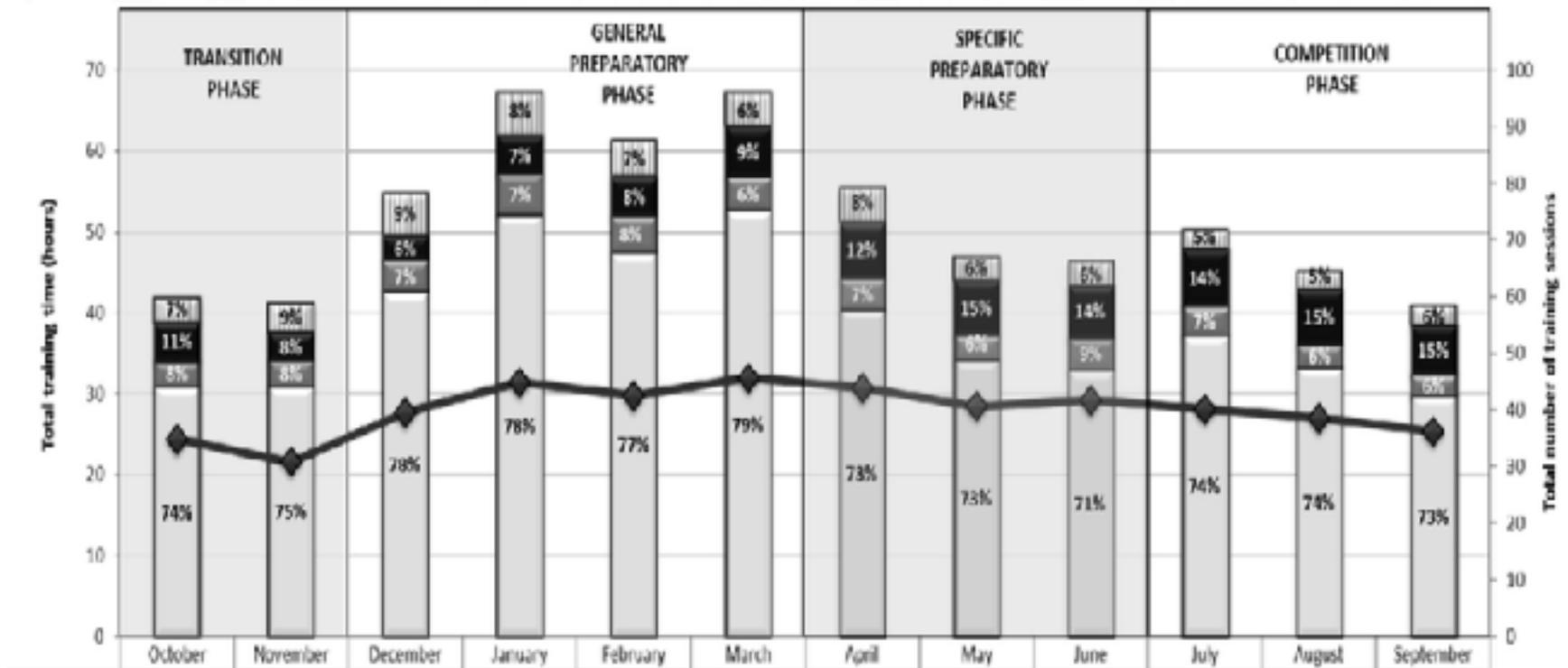
# 2nd Rule of Smarter Training

## Quality must be quantified

- **Using planned High Intensity Training (HIT) works best**  
Such as the proven 6 x 4' @ 88-90%HR (+RI of 2 - 4')  
This is very potent therefore must be surrounded by pure Z1 days
- **Only do HIT when Low Intensity Training (LIT) is correct**  
So Z2 “lapses of concentration” come out of your HIT allowance  
You may be “HIT” too many days per week already (2-3 is optimum)
- **Only add HIT if required for your goal**  
For a beginner, those in “get-around” mode or coming back to training the top of Z1 into Z2 to get “race-ready” (2-3 x 10') is hard enough to achieve race completion and enjoy training.

# NEW EVIDENCE

Tonnessen (2015) Orienteering elites across a whole season.  
Note: there is always at least 70% of training time in Zone I



# THE BIG MISTAKES

- **Randomly doing an interval session or “block”**  
Intervals cannot just be added to volume rises, competitions starting or when recovery or health is chronically affected.
- **Doing an interval that is traditional yet unproven**  
Several are erroneous: e.g. minute-on/minute off; build of speed towards end of long-ride/group run; time trials to replace endurance.
- **Failing to let adaptation take priority once work is done**  
If Elites/Top AG only do 2-4 intervals per week how can you do more and add additional “racing” sessions and then properly adapt?

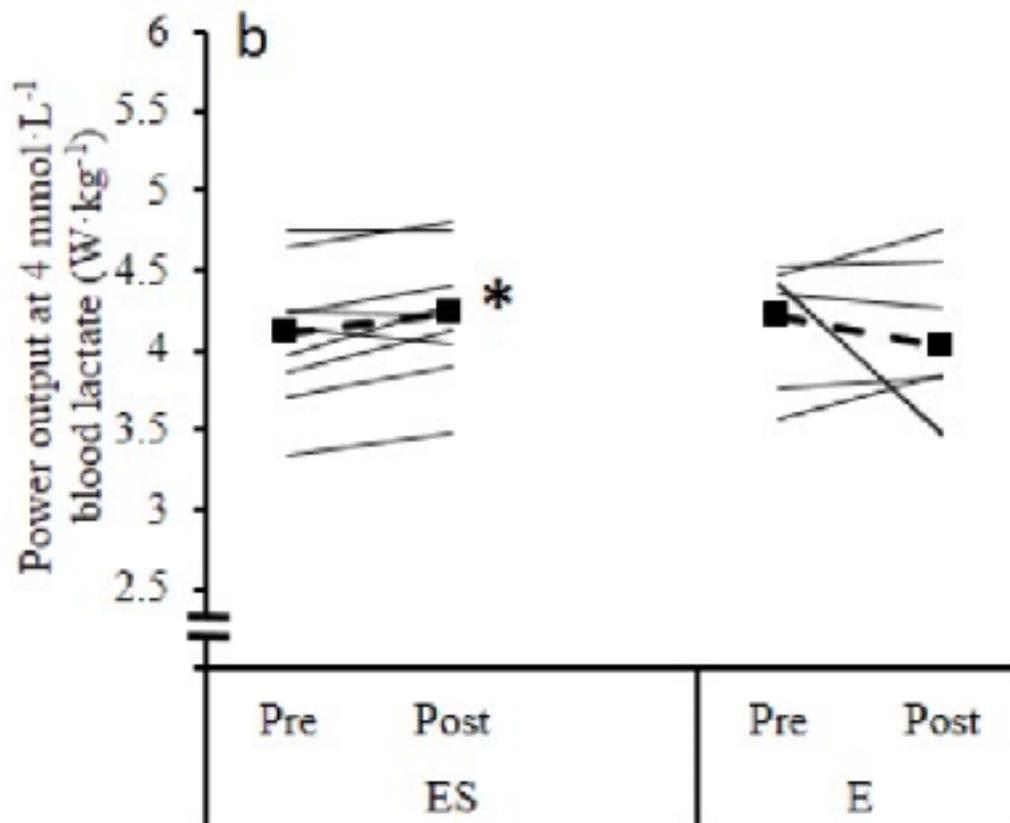
# 3rd Rule of Smarter Training

## Strength Training is essential

- **Make time to keep strength/conditioning:**  
Resistance training (machine, free weights, body weight) and Pilates/Plyometrics(?) NOT random circuit training
- **Make things harder from late WINTER into PRECOMP:**  
e.g. swim: two costumes, proper drag shorts(not t-shirts!), paddles, less drafting.  
e.g. bike: add weight, low cadence hills (4-6'@60rpm @60-75%PPO), ride on higher CRR tires.  
e.g. run: 8-15" hill reps, heavier shoes, pool DWR, pushing a Buggy, WeightBelt(? jury still out)
- **Prehab, rehab, beat ageing/bone-mineral-density drops:**  
It makes an athlete more “complete” and is no longer considered damaging to performance.

# NEW EVIDENCE

Rønnestad et al (2014) Cyclists endurance trained (E) or added strength (E+S).  
Note: E+S improved cycling economy and Time Trial ability (power output)



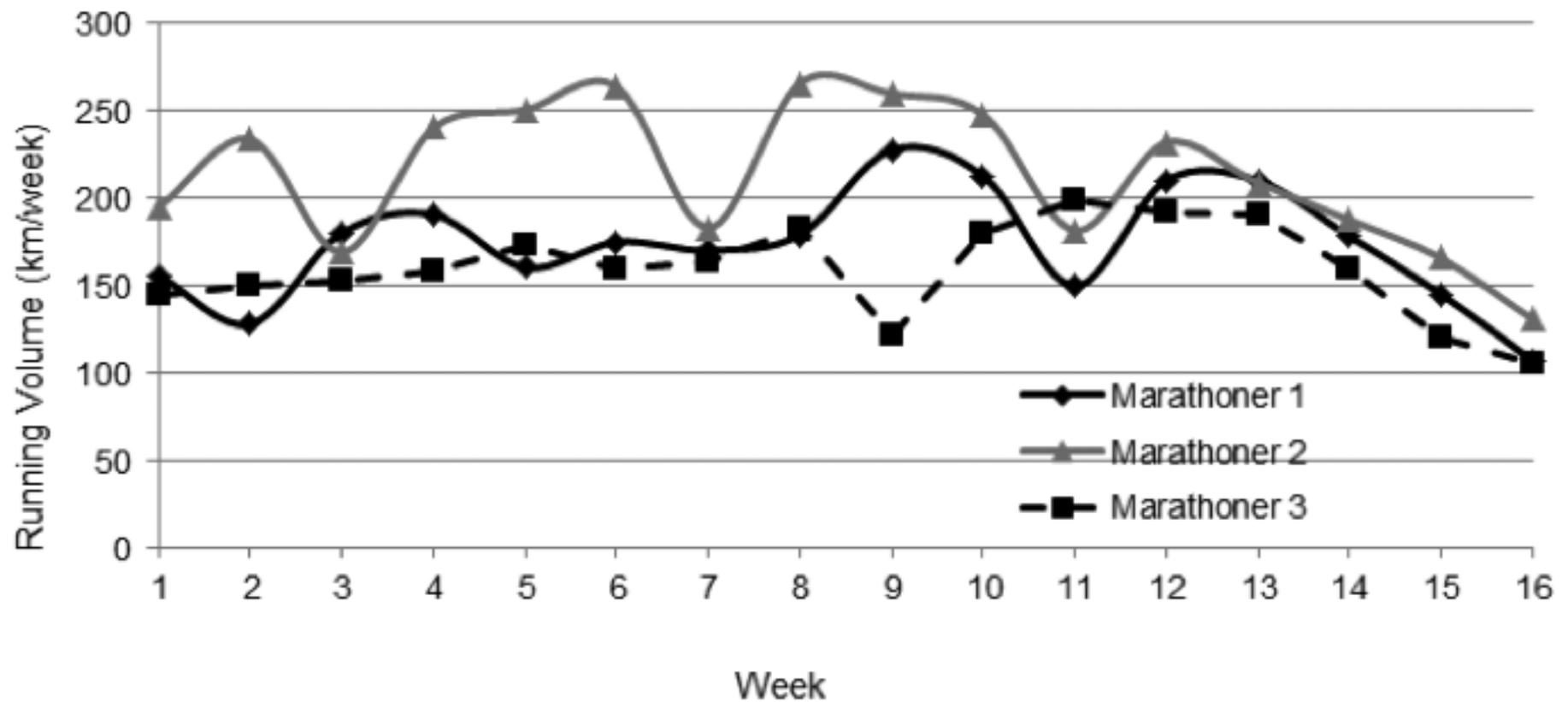
# 4th Rule of Smarter Training

## Plan 3:1 Blocks of Training

- **Use technology (paper & pen) or computer to plan:**  
e.g. 3:1 weeks, lighter days (low ZI technique), transition training, non-training days, alternative sports in offseason
- **Use realistic training volume (8hrs; 220 Reader Survey)**  
Don't get hooked on a number it will vary: 10, 8, 12, 6  
The training bank “builds” your fitness over time.  
It's all about ability, consistency and “ABSORBING”
- **Don't go Over-The-Top after your season**  
Less is gained Oct to Dec, more from Feb to April.  
Aim 60%-75% of volume you intend to peak “in-season”

# NEW EVIDENCE

Stellingwerff (2012) Elite marathoners training and practicing feeding.  
Note: 74% training was ZI; notice ebb & flow of volume ~3:1



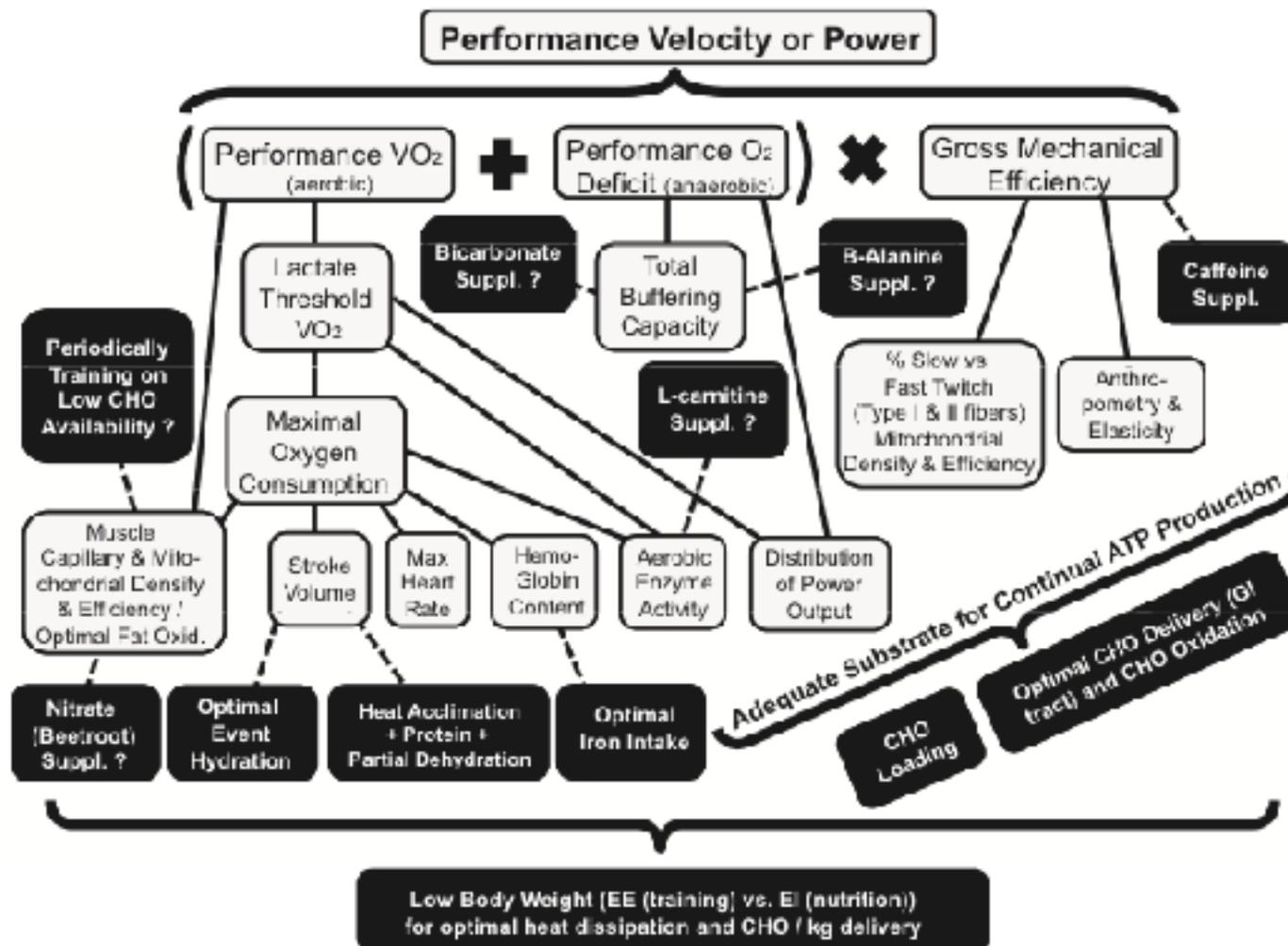
# 5th Rule of Smarter Training

## Nutrients can tweak genes/results

- **Use carbs in training - its the predominant fuel choice**  
Some fasted sessions help lean-burn ability but do compromise quality and the session must be controlled ZI
- **Protein timing has been shown to help “adaptation”**  
e.g. around weight training or endurance sessions. Plus shakes add an extra “easy” quality protein dose to the diet
- **Assessment of nutrient status is vital**  
e.g. blood profiling for Vitamin D, B12, Folate, Testosterone and others to ensure RBC, immune and health optimisation

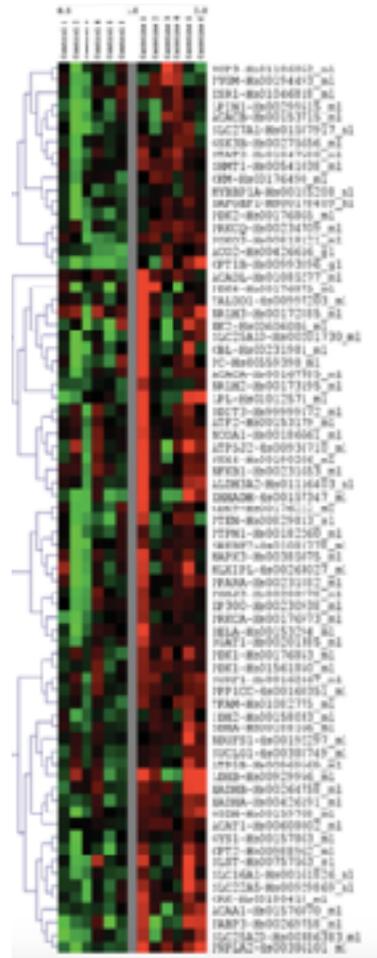
# NEW EVIDENCE

Stellingwerff (2014) Diet & supplementation can plug various areas of fatigue  
 Note: the correct place to supplement/target diet depends on the fatigue cause



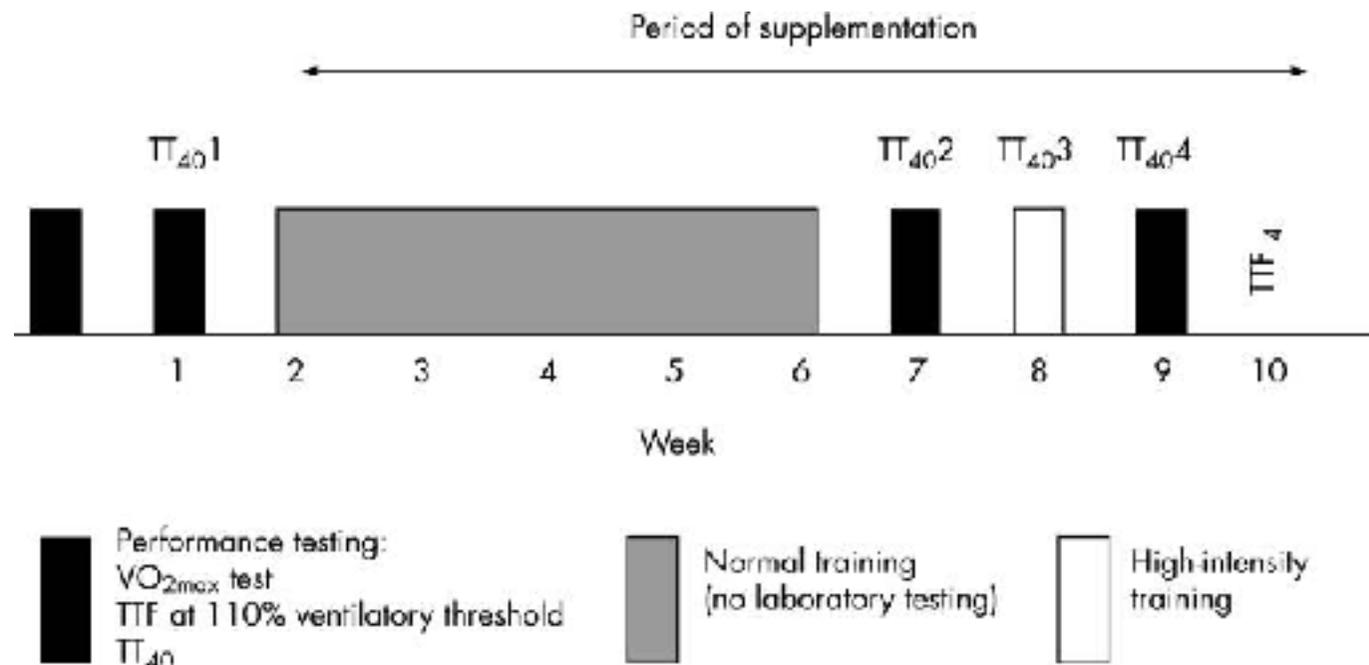
# NEW EVIDENCE

Stephens et al (2014) L-Carnitine loading actually triggers fat-use genes  
Note: This is despite lots of carbs being used to push it into the muscle.



# NEW EVIDENCE

Shing et al (2006) Colostrum (10g/d) had 1.9+/-2.2% improvement in TT40 performance and prevented a decrease in ventilatory threshold following the HIT period (4.6+/-4.6%).



# THE BIG MISTAKES

- **Missing the basics of diet & sports nutrition**

Nothing is THE super food or pill. Carbs fuel, water hydrates, treats are treats, protein should be spread out, good fats are “essential”

- **Random use of a supplement or super-nutrient**

Most effective results are using an effective dose for a specific time  
e.g. colostrum x 10g x 2 weeks or more = rebuilding/immunity

- **Assuming you “are” fit and you “have a great diet”**

If you don't know your “nutrient status” how can you tell what you need? Try to get a blood profile to find your weak nutrient areas.

e.g. *1990 Student (23): Hbn 13.3 ... 2015 Post Training Camp (47): 15.7*

# 6th Rule of Smarter Training

## Nuture not Nuke your body

- **Good Sleep is central to development**  
It's all about ability, consistency and “ABSORBING”  
Elites 10-12h/day and Amateurs 50-hour minimum rule.  
Setting bodies daily pattern with use of light is very effective!
- **Make daily wholefood nutrition a natural habit:**  
e.g. slow release carbs, real-food proteins, quality fats  
Don't try to be perfect just remember YAWYEAD  
(You Are What You Eat And Drink)
- **Body Work/flexibility must focus on your imbalances**  
e.g. poor shoulder mobility, leg tightness or cramping  
The right expert that is the challenge

# 7th Rule of Smarter Training Kit can make you faster

- **Buoyancy, flexibility, drag reduction wetsuits**  
It has to fit, be practised in year-round and be removed fast!
- **The bike has evolved beyond belief**  
Aero tubing, integrated hydration, electronic shifting, power measurement, lower effort tires, aero clothing.
- **Running requires good rebound, hence foam**  
Light mass means fast but rebound must aid running - use of DeepWater Running, body work and regular new shoes

# THE BIG MISTAKES

- **Not doing the sessions on your plan and training randomly**
- **Using equipment based on a whim not on science/sense**
- **Ignoring the importance of strength & conditioning**
- **Too high vitamin C and random supplementation**
- **Seeing bike power measurement/aerodynamics as “elitism”**
- **Not enough Zone One Training [55% - 80% of max HR]**
- **Ignoring recovery tools (e.g. foam rollers, compression tights/socks, TCLS)**

# HUNCHES THAT WORKED

- Training below 80% HRmax and using carbohydrate products
- Getting aero-optimised & very clothing, kit and pacing “savvy”
- Quality tires for racing with latex tubes
- Colostrum use on a regular basis in and off-season
- Pacing using bike power measurement to run better off the bike
- L-Carnitine supplementation
- Using blood data to tweak diet, supplements, training, lifestyle
- Using off round chainrings (e.g. Biopace, Osymetric, Rotor Q, QXL, Absolute Black, AeroCoach)
- Being consistent as a result of enjoying the here-and-now

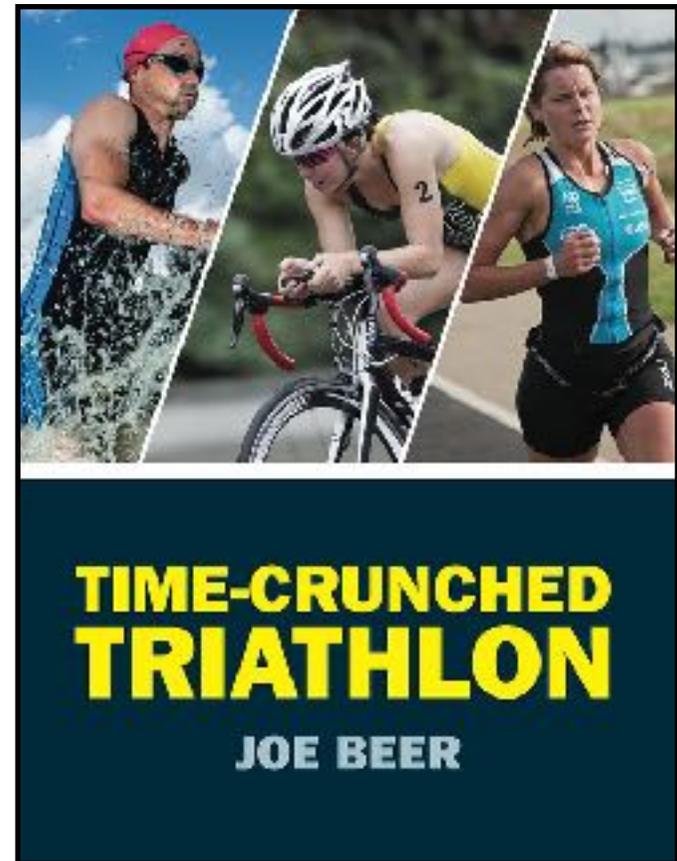
# TAKEAWAYS

- Training <80%HRmax must be a key habit, see [www.bit.ly/road2gold](http://www.bit.ly/road2gold)
- Hard work sessions must be well planned/spaced
- Nutrition timing and type impacts performance gains significantly
- Bikepower technology is a serious but effective tool
- Bodywork, DIY foam rolling etc remains a priority
- Fasted sessions & low-carb training has a place
- Blood profiling and TCLS (?) are the new “super-hacks”



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