NOT GOT TIME TO READ IT ALL?
HERE’S THE POSITIVE “TAKE AWAYS”…

● Training <80%HRmax must be a key basic habit. #1 BKM
● Diary used to plan: work blocks/tapers/adaptation(??)/race-recovery
● Start with PLAN A but adapt to your reality & be time efficient
● Diet/Supplements timing/loading/testing impacts performance
● Bikepower/Drag measuring tech are seriously effective tools
● “Bodywork”, DIY foam rollering etc remains a weekly priority
● Fasted sessions/low-carb/race-feeding have to be periodised
● Blood profiling and HRV are the essentials to Peak Performance
Phil Graves

Lauren Dolan

Shadrack Biwott

Crystal Spearman
The Brownlees

3 in Kona

Forth Edge Profiling
Starting point...

Popper's criterion of demarcation (that which separates pseudoscience from science) is the tenant of falsification. As such, scientists need to understand that the most effective way to prove a theory or specific knowledge is to demonstrate the inability to falsify it.
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TRAINING
To achieve goals **consistency** in training 3 sports is paramount
Top AG/Elites train 8-18h/wk - 20-35h/wk (400-1200h/year)
Mixing around 75-90% Z1 / 5-15% Z2 / 10% Z3/Strength.
No elite endurance athlete trains 5-6h a week all as HIT efforts.

NUTRITION
**Personalised** nutrition programmes are the new “STACK.
e.g. low glycogen sessions; “whole”protein meals; race-feeding;
augmentation with relevant vitamins/minerals/ergogenics
Fads and Pseudoscience is running amok, and is unproven.

TECHNOLOGY
“Kit Doping” (Aston 2013) is fine when within the rules.
Leverage to the maximum to maximise your genetic/experience.
e.g. **long arm tri suits**, drag reduction bikes/clothing, compression etc
You cannot just try harder or overcome physics. “Kit” Augments
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:

Analysis of effective JBST clients show: 80-90% per annum in Zone 1

*Worlds Most Successful Female XC Skier:* 92.3% in Zone 1

*Elite Marathoners (Nov-Feb/Mar-Apr/May-Aug):* 83.3/84.7/79.9% Zone 1
Solli et al (2017) Training Characteristics of Worlds Most Successful Female XC Skier

VO2max 67ml.kg.min⁻¹

6 gold medals at the Olympic Games
18 gold medals at the World Championship
110 World Cup victories

5 yrs @ 937h/yr (approx 20% was at altitude). [783h Z1 = 83.6% Vol]

543 sessions/yr = 849h endurance** // 75h strength // 14h speed training

** =91% endurance of which 92.3% in Zone 1 (Z2=2.9%, Z3=4.8%)

Z1 sessions consisted of:
21% warm up
14% <90mins
65%>90mins (Psst... so elite athletes do a lot of Long Slow Distance)
Just look at the green bit!
I've been using Coach Joe's Z1 focused system for five months and I'm in the best shape I have been in January for many, many years in measurable terms such as training hours achieved, heart rate, body composition, lack of general health and injury problems. Other “time crunched” or “high intensity” style coaching programmes used in previous years have always resulted in me breaking down at some stage. The Z1 approach has given me a real foundation. I was initially concerned about “junk miles” using the methodology, but I couldn’t have been more wrong. It works.
REAL LIFE

Having recently started with Joe I was skeptical at the outset of the benefits of zone 1 training but I have carried out all of my training in this lower zone for three months and the gains have been huge!! An example recently has been a reduction in run pace from over 8 minute miling to sub 7 minute miling for periods during a recent test!! I'm now doing more training as I can recover better and everything surrounding the sport is so much better!!
HOW TO DO IT BEST?

● DATA
Download simple HR data and split into Z1/2/3.
e.g. Mac (ismarttrain.com), Garmin supported devices/mobile App and Desktop version (Garmin Z1, 2, 3 = true Zone 1)
Good athletes have this data because it’s NOT an option.

● SIMPLE 80/20 RULE
Find the proportions and stick to: pure Z1 sessions, at least 80% aerobic training in Z1 and controlled aerobic benchmarks (e.g. Aerobic Mile)
Planning sessions, knowing your weekly trend & benchmarking

● TWEAK. LEARN
The best plans adapt they are not written in stone. “A starting guess”
Poor discipline, route choice, lack of freshness is a learning opportunity
You need a disciplined approach not more discipline or motivation
2nd Rule of Smarter Training

Quality must be planned
• Plan High Intensity Training (HIT)
  Such as the proven 2/wk: 6 x 4’ @ 88-90%HR (+RI of 2 - 4’)
  This is very potent over a 4 to 6/8 week period.

• Only once Low Intensity Training (LIT) is correctly topped-off
  Z2 “lapses of concentration” come out of your 20% HIT allowance
  You may be “HIT” too many days/week already (2-3 is optimum)

• Only add HIT if required e.g. close to a “HIT-limited” A goal
  Once training at the top of Z1 is fast it’s time to add more quality to
  be race ready. Until then enjoy the 300-1000 hour rule of training.
NEW EVIDENCE

Solli et al (2017) Training Characteristics of Worlds Most Successful Female XC Skier
THE BIG MISTAKES

• Going too hard to soon
  All interval studies, Elite training plans and their diaries include time to get the muscles warmed-up (XC skier 21% was noted “warm up”). “Too-hard, too-soon” activates “stress” response even in Z1.

• Calling anything Zone 2 “base” training or steady
  80%HRmax is the Zone 1 limit. Above is stressful “no-mans land”
  Choose terrain, weather and groups that match your ability.

• Not doing sessions to a BKM plan
  The plan before should be mirrored by the data after. “Felt good went faster” “Good at end so did efforts” etc
  This is bad discipline. This will make you less effective.
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, and 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.
THE BIG MISTAKES

● Going too heavy to soon
  All joints, ligaments etc need weeks to adapt to the stress.
  6-8 weeks low to moderate preparation training.
  Building to 8-10 RM resistances in 20-45 minute sessions x2/wk

● Being sporadic, especially in the pre-season/season
  Start with intention to devote time or just don’t start
  Choose a day with less aerobic training

● Not doing sessions to a routine
  Random “classes” or no set muscle-pattern plan
  Pre-printed plan, clipboard and subtle progression/adaptation.
4th Rule of Smarter Training

Plan 3:1 Blocks of Train: Adapt
NEW EVIDENCE

Stellingwerff (2012) Elite marathoners training volume ebb-and-flow. Note: 74% training was Z1; they also planned feeding-during-training key sessions
Use technology (paper & pen) or computer to plan:
e.g. Adapt weeks = lighter days, low Z1 technique, transition training. Also non-training days, alternative sports in off-season

Use realistic volume (220 Reader Survey: average=8h/wk)
Don’t get hooked on a number it will vary: 10, 8, 12, 6
The training consistency “builds” your fitness over time. It’s all about planning, being-flexible and “ABSORBING”

Don’t go Over-The-Top after your season
Less is gained Oct to Dec so aim for 60%-75% of volume you intend to peak “in-season”. Productive build from Feb to April.
Nutrition
5th Rule of Smarter Nutrition

Nutrients fuel results
Use carbs in training - it's the predominant fuel choice. Some fasted sessions (<2h) help lean-burn ability but do compromise quality and the session must be controlled.

Quality Protein timing helps “adaptation”:
- e.g. around hard resistance training or at night (25-40g). Plus shakes add an extra “easy” quality protein dose to the diet.

Tracking Profile of nutrient status is essential (~£400/yr):
- e.g. tri-monthly profiling for Hbn, Vitamin D, B12, Folate, Testosterone and others to ensure blood, immune system and health optimisation (around 20% of metrics are out of range - so 1 in 5 things could be better.)
NEW EVIDENCE

Mcdonagh et al (2017) Mouthwash effects on Nitrate Loading

Conclusion

In summary, this study has shown that regular mouth-rinsing with a chlorhexidine-containing mouthwash and also a non-chlorhexidine-containing mouthwash, attenuated the rise in plasma $[\text{NO}_2^-]$ following chronic supplementation with $\text{NO}_3^-$-rich beetroot juice. BR did not significantly reduce BP during seated and supine rest or during treadmill walking. However, prior rinsing with a chlorhexidine-containing mouthwash led to a greater increase in BP during low-intensity exercise compared to the control condition. Our study adds to the growing body of literature [17, 24, 38] indicating that antibacterial mouthwashes have the potential to counteract the beneficial effects on cardiovascular health afforded by the consumption of $\text{NO}_3^-$ in the diet.

STRONG; Corsodyl®, WEAK; Vademecum med – mouth-rinse 15 min prior to BR ingestion
Eat Plants 4 months ago
Sausages and burgers kill red blood cells, clog arteries and are high in trans and saturated fat, that your body will easily store. Anti-doping.
Ironman male athlete low-haemoglobin: tested, “flagged”, actioned and re-tested.

RESULT: up 11.62%
NEW SERVICE

jbst.biomarkertracking.com

Get your blood profiling and training over-seen to ensure that your training and diet optimise your results, consistently
COUNTER ARGUMENTS

The “craze” for Very Low Carbohydrate Feeding

An attempt to make athletes super fat efficient, lean and faster. Carb drinks, gels etc are a scam by big companies. Blah Blah Blah.
NEW EVIDENCE

Triathlon Ironman performance and fat burning capacity.

![Graphs showing relationships between race time and MFO, VO2peak, and body fat percentage.](image)
Burke et al (2017) Low carbohydrate, high fat diet impairs exercise economy and negates the performance benefit from intensified training in elite race walkers (10k PB 40-41 minutes)

They got good at fat burning...
NEW EVIDENCE

Burke et al (2017)

...but ended up being slower!
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**
  Positive results are from an **effective dose for a specific time**
  e.g. **colostrum**: 10g twice a day x 2 weeks = rebuilding gut damage

- **Assuming you “are” fit and you “have a great CLEAN diet”**
  If you don’t know your “nutrient status” how can you tell what you need? Get **ForthEdge blood profile** to find your weak nutrient areas.
  e.g.
  
  **1990**  **Student (23):**  **Hbn 13.3**
  **2015**  **Post Training Camp (47):**  **Hbn 15.7**
  **2018**  **Winter (50):**  **Hbn: 15.3 and 15.5**
6th Rule of the Smart Athlete:

Nuture not Nuke your body
● **Good Sleep is central to development (but don’t stress it)**
  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!
  e.g. [HumanCharger](#) 2 x 12minutes per day

● **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
  To find the **right expert** is the challenge or making the jump into
  Pilates, Yoga, Bowen, foam rollering etc.
Use HRV to monitor adaptability

- This is HR Variability between individual heart beats at rest
  e.g. at 60 bpm the variability can still be 500-1500ms
  A typical figure is 50 = tired/over-reached-stressed and
  80-100 when fresh, adapted or tapering.
  e.g. ithlete App on iOS/Android + compatible device/HR Bluetooth strap

- It sums up the total impact of training, work, life etc
  Research on Elites and Amateurs shows it is an effective tool.
  It catches motivated people on a downward spiral or shows them that rest or
  tapering is having the desired effect.

- From CEO to Sportive rider it has helped
  e.g. illness “tail” able to be assessed by session effort and the HRV
  e.g. peak event taper goes well as HRV goes up and peak Performance occurs
  e.g. business high-alert causes drop of 40 units, reverted with Z1 slow build
7th Rule of Smarter Technology

Kit can make you faster
Buoyancy, flexibility, drag reduction wetsuits
It has to fit, be practised in year-round and be removed fast!
Test suits for speed? GPS track you navigation ability?
Faster processing will allow force analysis under water, soon.

The bike has evolved beyond belief
Aero tubing, integrated hydration, electronic shifting, power measurement, lower effort tires, full-aero clothing/testing.

Running requires good rebound and low mass
Biomechanical analysis? Possible “High-Tech Recovery Boots”? Tracking of body composition in critical race build?
DeepWater Running?
NEW EXPERIENCES…  
psi verses tpi

Sweet spot from approx 75psi (rough) to 95 psi (smoothest)
NEW ADVICE…
psi verses kg verses mm

<table>
<thead>
<tr>
<th>TYRE WIDTH</th>
<th>BODY WEIGHT 60kg / 132lb</th>
<th>BODY WEIGHT 85kg / 187lb</th>
<th>BODY WEIGHT 110kg / 242lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>23c</td>
<td>7 bar / 100psi</td>
<td>8 bar / 115psi</td>
<td>9 bar / 130psi</td>
</tr>
<tr>
<td>25c</td>
<td>6.0 bar / 87psi</td>
<td>7.0 bar / 100psi</td>
<td>8.0 bar / 115psi</td>
</tr>
<tr>
<td>28c</td>
<td>5.5 bar / 80psi</td>
<td>6.5 bar / 94psi</td>
<td>7.5 bar / 108psi</td>
</tr>
<tr>
<td>32c</td>
<td>4.5 bar / 65psi</td>
<td>5.5 bar / 80psi</td>
<td>6.5 bar / 94psi</td>
</tr>
<tr>
<td>37c</td>
<td>4.0 bar / 50psi</td>
<td>5.0 bar / 72psi</td>
<td>6.0 bar / 87psi</td>
</tr>
</tbody>
</table>

Tyre pressure recommendations provide a starting point – adjust them with terrain and weather conditions.
SAME ADVICE: use your watts wisely

<table>
<thead>
<tr>
<th></th>
<th>% PPO</th>
<th>LIMITATIONS</th>
<th>e.g. 250w female</th>
<th>e.g. 350w male</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEAK POWER</strong></td>
<td>100</td>
<td>ultimate muscle fatigue</td>
<td>250</td>
<td>350</td>
</tr>
</tbody>
</table>
| **10-MILE TIME TRIAL** | 80     | acidosis  
pain tolerance  
pace judgement            | 200              | 280            |
| **IRONMAN**    | 55    | glycogen saving  
saving up a "marathon"  
temperature build-up | 137              | 192            |
| **SPRINT**     | 65    | close to acidosis  
high muscle-tension  
immediate run-speed? | 162              | 227            |
SAME ADVICE: aero, aero, aero
long sleeves, trips, aero tri belt, aero calfs guards...
8th Rule

The future is bright
FUTURE METHODS...

SWIM: Using at-home Vasa Trainer Swim Bench to work on muscular endurance training
FUTURE METHODS…

BIKE: Using aerodynamic analysis at-home to work on training and improving aero position…

Training Statistics

- Duration: 4min 07s
- Zone 1: 72% 2min 57s
- Zone 2: 28% 1min 10s
- Zone 3: 0% 0min 00s

Reference Pose:
311 W - 0.3554 m²
FUTURE TRENDS…

We are in the 4th Industrial Age (Schwab 2017) with machines, platforms, connectivity…

• Be aware that data, sensors and analysis are growing
  It has to enhance the session goal not just create data

• The use of 4th Gen should be for time efficiency
  Booking sessions, planning week, checking weather/race info.
  Not wasting time and affecting sleep due to evening screen use

• Tech must be used to simplify not constrain or confuse
  e.g.” I can’t go riding because my power meters not working”
  or “I have the session on Strava and Garmin but it was not as
  per the Zone 1 plan”
THE GREATEST STORIES ARE LIVED, NOT TOLD.
THE BIGGEST MISTAKES

• Following the nopain-nogain #smashitup ethos
• Ignoring equipment/nutrition as a way to “enhance”
• Missing rehab/strength & conditioning or the Zone 1 habit
• Too/high or low vitamin status due to random dosing
• Ignoring optimal personal power pacing and all that is “Aero”
• Failing to periodise carbs before/during/after training
• Ignoring simple recovery tools (e.g. rest days, foam rollers, compression tights/socks, massage, naps, warm baths etc)
• Failing to correctly leverage 4thGEN for “refinement”
BKM TAKEAWAYS

- Training <80%HRmax must be a key basic habit. #1 BKM
- Diary used to plan: work blocks/tapers/adaptation(?)/race-recovery
- Adapt to your reality not Plan A, others plan or “ideal”
- Diet/Supplements timing/loading/testing impacts performance
- Bike power/Drag measuring tech are serious but effective tools
- “Bodywork”, DIY foam rollering etc remains weekly priority
- Fasted sessions/low-carb/race-feeding have to be periodised
- Blood profiling and HRV are the essentials to Peak Performance
Coach - Bike Fitter - Aero Optimiser
Author - Speaker - Brand Ambassador
Expertise from over 30 years experience

www.CoachJoeBeer.com
HUNCHES THAT WORKED (BEFORE THE INTERNET)

- Training below 80% HRmax and using carbohydrate products
- Getting aero-optimised & very clothing, kit and pacing “savvy”
- Quality wheels and tires for racing - hack-bike(s) for training
- Colostrum use on a regular basis in- and off-season
- Pacing using bike power measurement to run better off the bike
- L-Carnitine and Glycerol (now legal again) supplementation
- Using blood data to tweak diet, supplements, training, lifestyle
- Using off-round chainrings (e.g. Biopace(?), Osymetric, Rotor Q, QXL, Absolute Black,)
- Being consistent as a result of enjoying the here-and-now
There is only one magic… and that is hard work, sustained by clear vision, iron will and the strictest discipline”

*Indira Gandhi*