

THE PARABLE OF PERIODIZATION:
Resurrecting the Foundation of the Training Process

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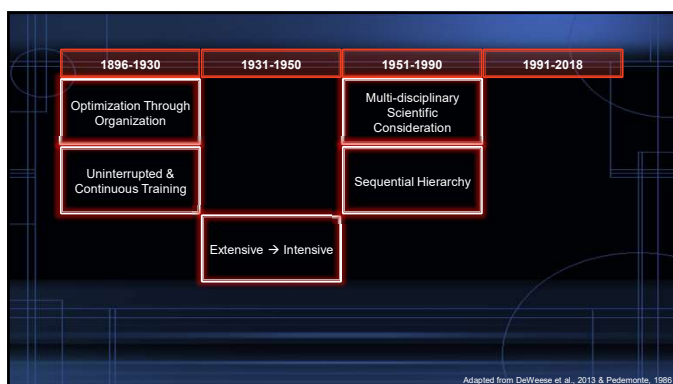
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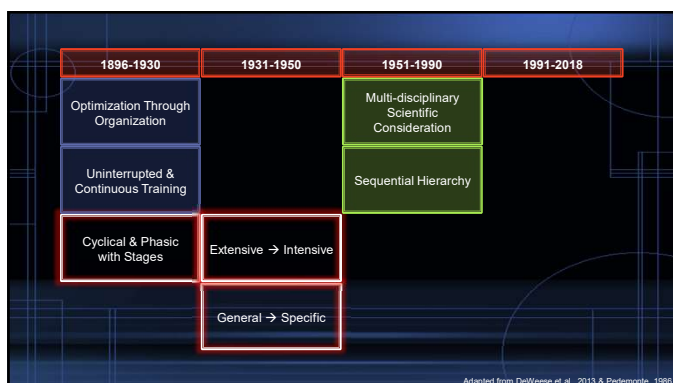


Collective goals of periodization

- 1 Properly manage fatigue to minimize potential for overtraining & injury.
- 2 Maximize adaptations to training & positively alter physiology.
- 3 Maximize performance preparedness at predetermined timepoints.







1896-1930	1931-1950	1951-1990	1991-2018
Optimization Through Organization	Planned Variation & Restitution	Multi-disciplinary Scientific Consideration	
Uninterrupted & Continuous Training	Reduce Likelihood of Overtraining & Injury	Sequential Hierarchy	
Cyclical & Phasic with Stages	Extensive → Intensive		
Consideration of Individualized Response	General → Specific		

Adapted from DeWeese et al., 2013 & Pedemonte, 1986

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Consideration of Individualized Response	General → Specific	Scalability & Summation of Training Effects	

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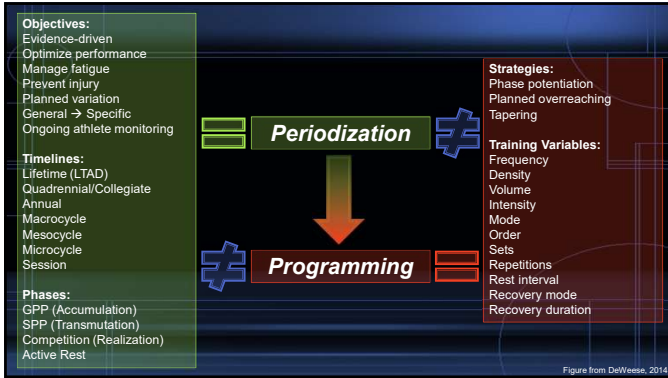
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Optimization Through Organization	Planned Variation & Restitution	Multi-disciplinary Scientific Consideration	Scientific Evolution & Evidence-based
Uninterrupted & Continuous Training	Reduce Likelihood of Overtraining & Injury	Sequential Hierarchy	Context-specific Evidence
Cyclical & Phasic with Stages	Extensive → Intensive	Workload Structure	Forecast Training Needs & Responses
Consideration of Individualized Response	General → Specific	Scalability & Summation of Training Effects	Ongoing Athlete Monitoring

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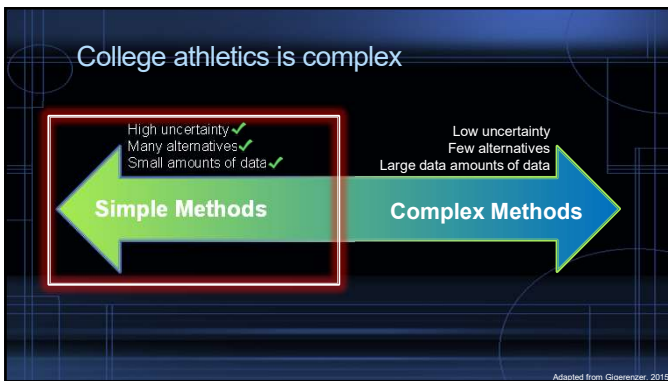
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The death of periodization

“If there is one self-limiting tendency among strength and conditioning professionals, it is that we often focus on numerical models, rather than underlying strategy when designing programs...”

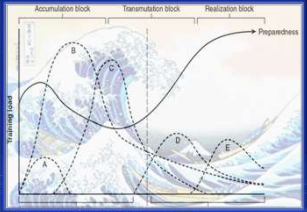
Plisk & Stone, 2003
Yuri Verkhoshansky, 2009



Fractals & Physiology

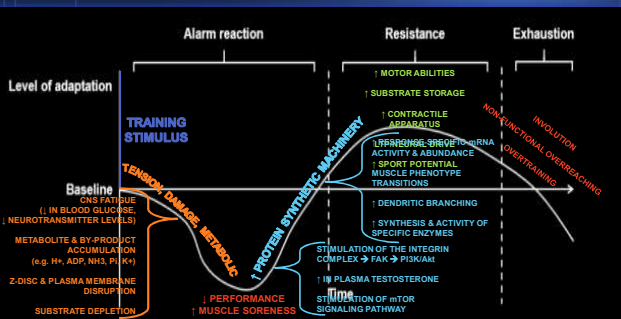
Exploiting physiology through systemic organization

Self-similarity & scalability of periodization



- Similar patterns recur at progressively smaller scales
- Fractal organization represents complex, adaptive systems
- Interrelatedness of numerous components at various scales increases overall functionality
- Systemic organization allows perturbations to be attenuated

Figure adapted from Hokusai, Hoff in Hoffman, 2012



Alarm reaction

- ↑ TENSION, DAMAGE, METABOLIC
- ↑ PERFORMANCE
- ↑ MUSCLE SORENESS

Resistance

- ↑ PROTEIN SYNTHETIC MACHINERY
- ↑ MOTOR ABILITIES
- ↑ SUBSTRATE STORAGE
- ↑ CONTRACTILE ORGANIZATION
- ↑ ABNORMAL SPINDLE RNA ACTIVITY & ABUNDANCE
- ↑ SPORT POTENTIAL
- MUSCLE PHENOTYPE TRANSITIONS
- ↑ DENDRITIC BRANCHING
- ↑ SYNTHESIS & ACTIVITY OF SPECIFIC ENZYMES
- ↑ STIMULATION OF THE INTEGRIN COMPLEX → FAK → PI3K/AKT
- ↑ IN PLASMA TESTOSTERONE
- ↑ STIMULATION OF mTOR SIGNALING PATHWAY

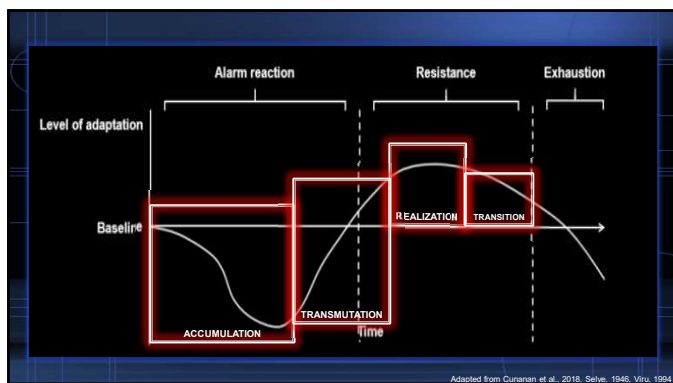
Exhaustion

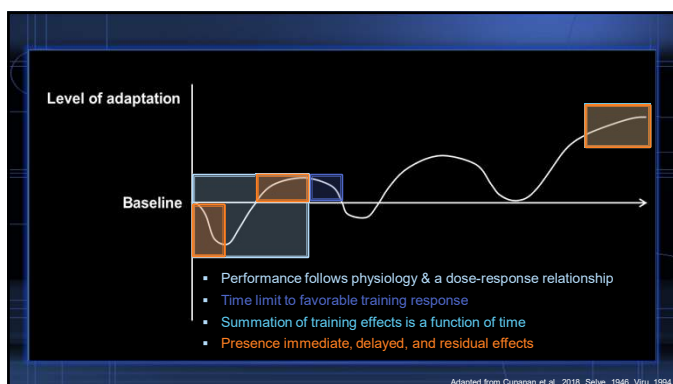
- NON-FUNCTIONAL OVERREACHING
- LOW TRAINING
- INVOLUTION

Baseline

- ↑ CNS FATIGUE
- ↑ IN BLOOD GLUCOSE
- ↑ NEUROTRANSMITTER LEVELS
- METABOLITE & BY-PRODUCT ACCUMULATION (e.g. H⁺, ADP, NH₃, Pi, K⁺)
- Z-DISC & PLASMA MEMBRANE DISRUPTION
- SUBSTRATE DEPLETION

Adapted from Cussins et al. 2016, Sakun 1996, Vasa 1994





Adding context to control complexity
 Understanding the role of athlete monitoring

The tailor



The coach



Utility of athlete monitoring

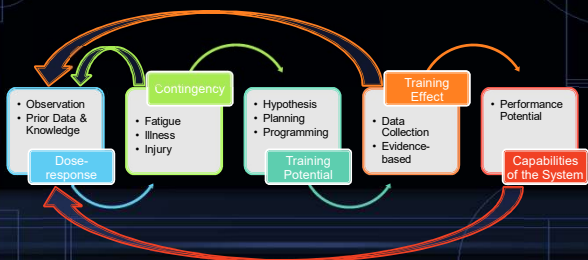
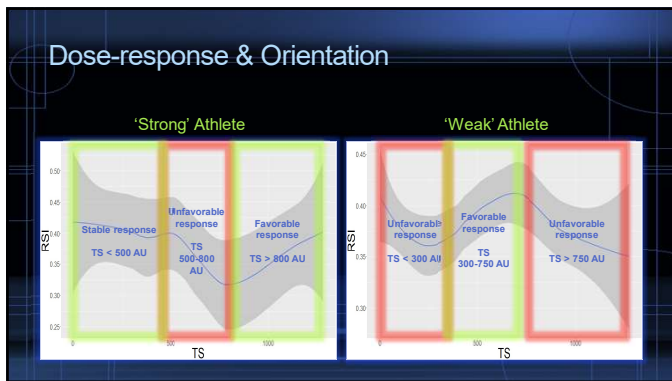
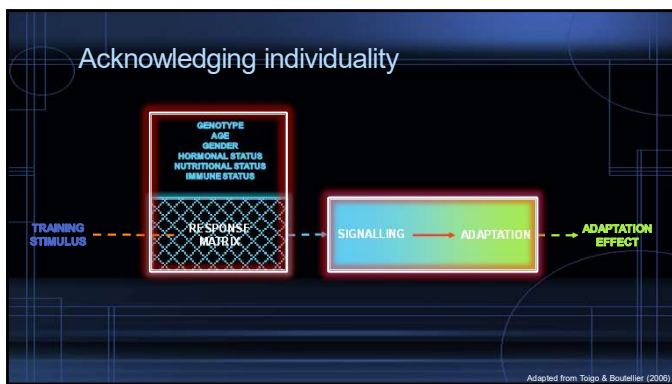
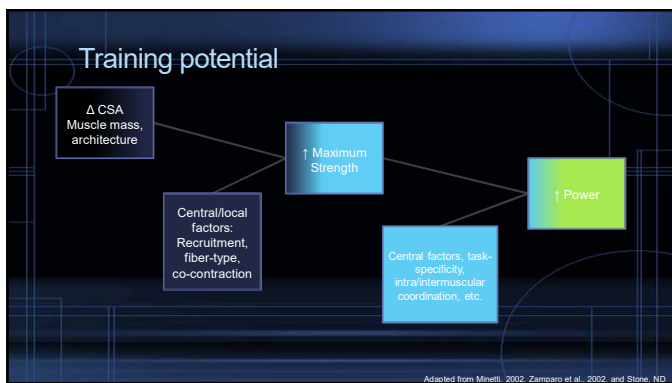


Figure adapted from Martinez, 2018; Sands et al., 2005; Sands, 2016; Verkhoshanskii & Siff, 2009







Training potential

BASIC STRENGTH	ABSOLUTE STRENGTH	ABS. STRENGTH/STRENGTH-SPEED
3x5/3x5/3x5 85/90/92.5%	3x3/3x3/3x3 85/92.5/75%	4x3/3x2/3x2 85/90/95%

Training effect

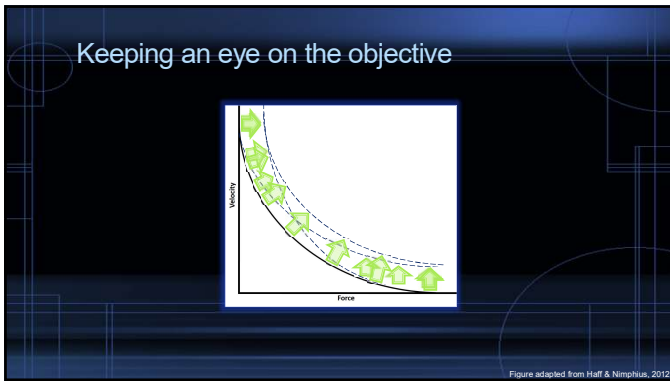
- Body mass
- Girth
- Skinfolds

- Loaded static jumps (0-80 kg)
- Primary variables of interest:
 - JH, PPa, F @ PP, v @ PP

- Isometric MTP
- Primary variables of interest:
 - IPFa
 - RFD – 50 ms
 - Impulse – 150 ms

Training effect

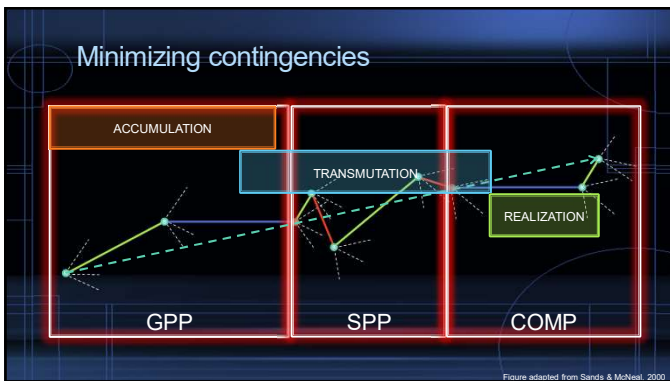
BPFA (N/KG ²)	217.50	235.98	+9%
WFO (0.01/100%)	4187.00	5248.94	+25%
WFL (0.01/100%)	250.18	260.28	-3%

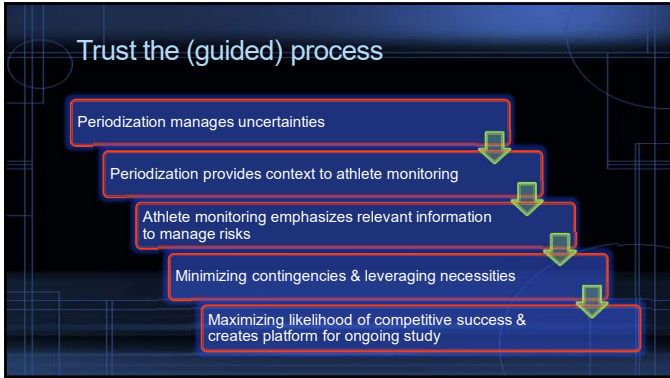


Time course of adaptations

Cohen's d Effect Size

Load	JH - FT	PP-a	F @ PP	V @ PP
0 kg	0.06 ↑ Trivial	0.00 ↔ Trivial	0.01 ↔ Trivial	0.00 ↔ Trivial
20 kg	0.09 ↑ Trivial	0.07 ↑ Trivial	0.10 ↑ Trivial	-0.02 ↔ Trivial
40 kg	0.08 ↑ Trivial	0.06 ↑ Trivial	0.11 ↑ Trivial	0.02 ↔ Trivial
60 kg	0.17 ↑ Trivial+	0.20 ↑ Small	0.12 ↑ Trivial	0.19 ↑ Trivial+
80 kg	0.23 ↑ Small	0.09 ↑ Trivial	0.09 ↑ Trivial	0.04 ↑ Trivial





Closing remarks

- Periodization provides a **robust blueprint** that has withstood the rigors & conditions of high-level athletics
- Self-similarity & scalability** are characteristics of periodization that warrant greater consideration
- Athlete monitoring** augments & optimizes periodization – not replaces it

"Plans are useless, but planning is indispensable."
Dwight D. Eisenhower



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Supplementary materials available upon request.

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