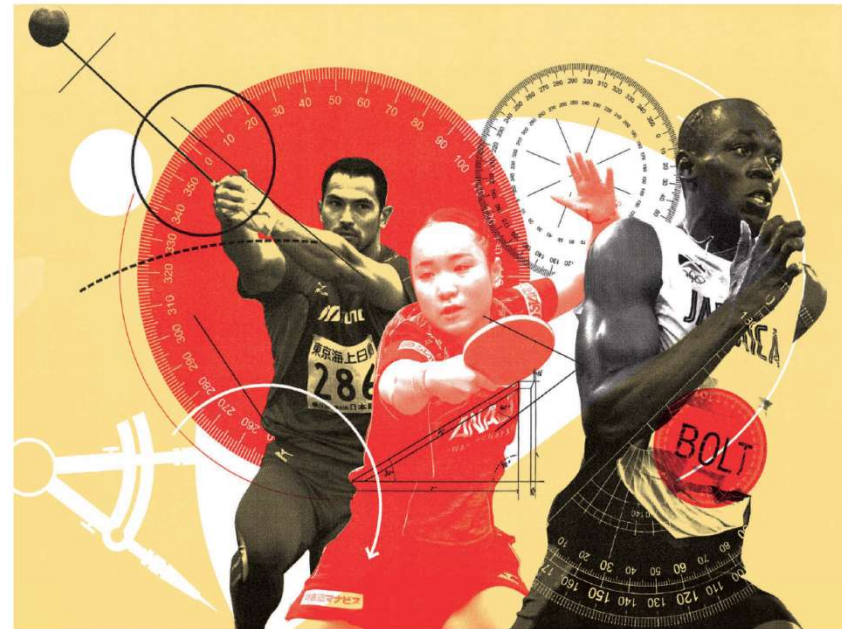


Carico e recupero: evidenze e pratica, dentro e fuori l'allenamento

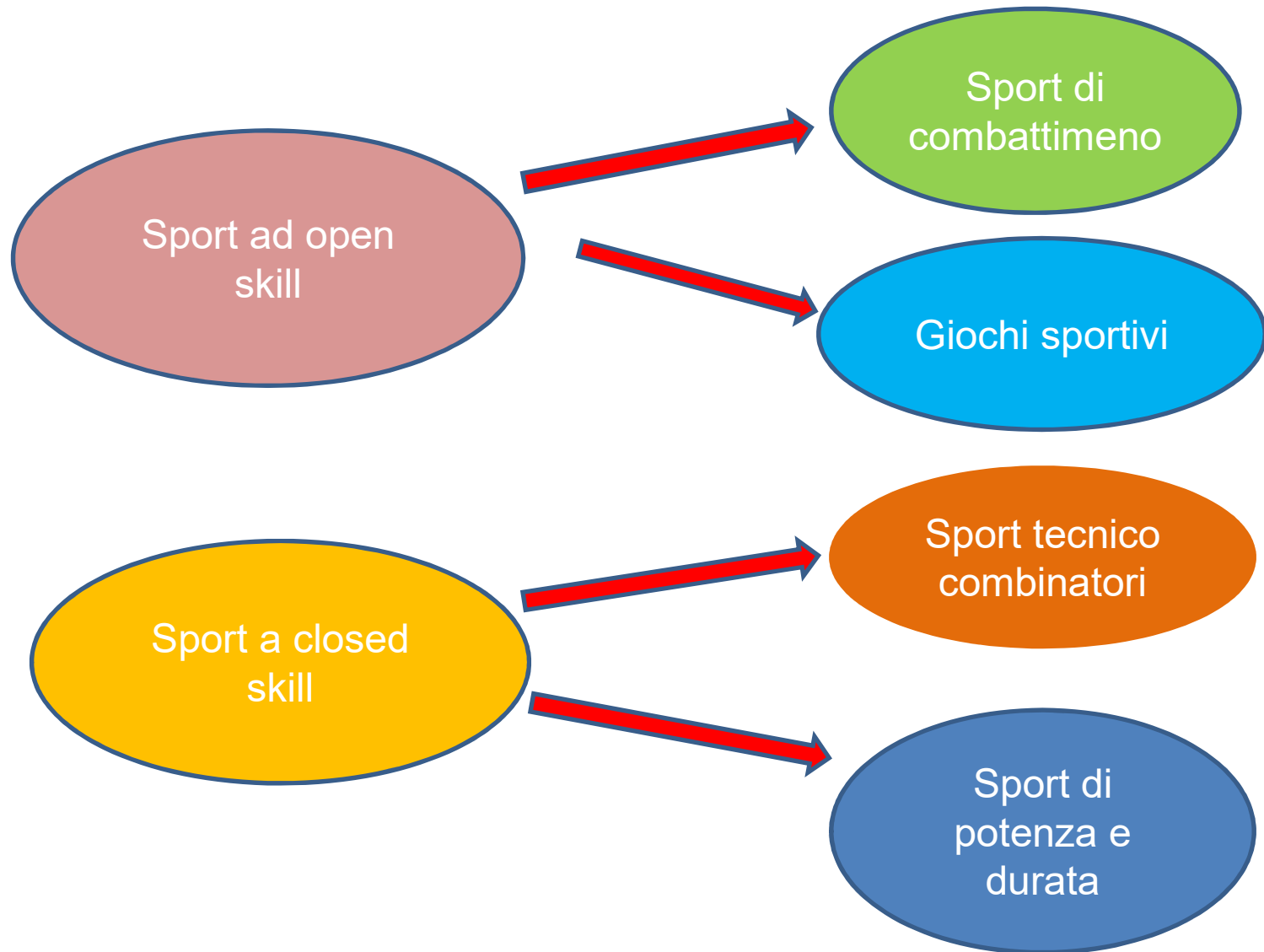
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lunedì 15 ottobre 2018

Renato MANNO

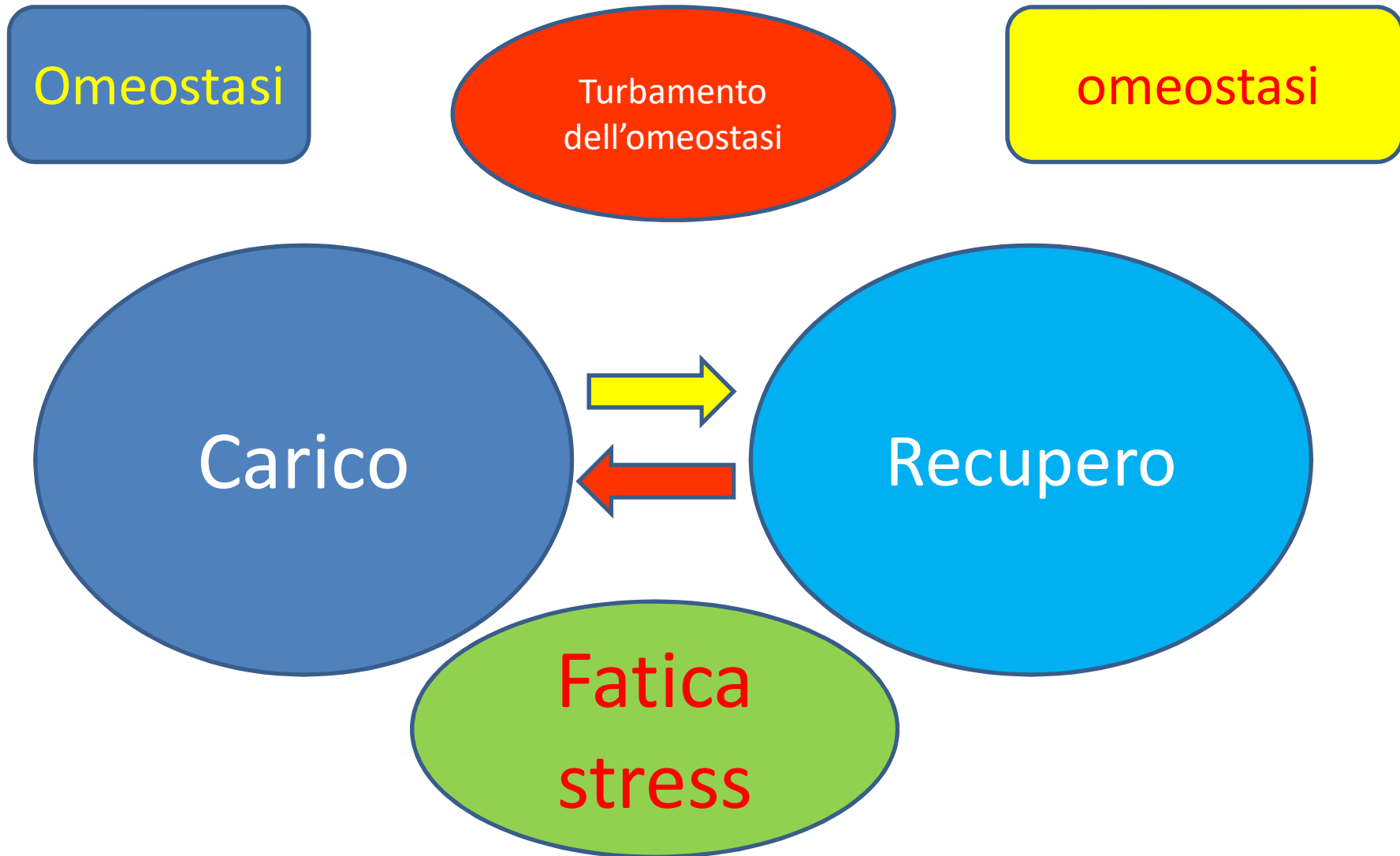
Italia
Scuola
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La specificità degli sport



GAS (GENERAL ADAPTATION MODEL)





Atleta



carico

Interno

Esterno

allenamento

Competizione

allenamento

Competizione

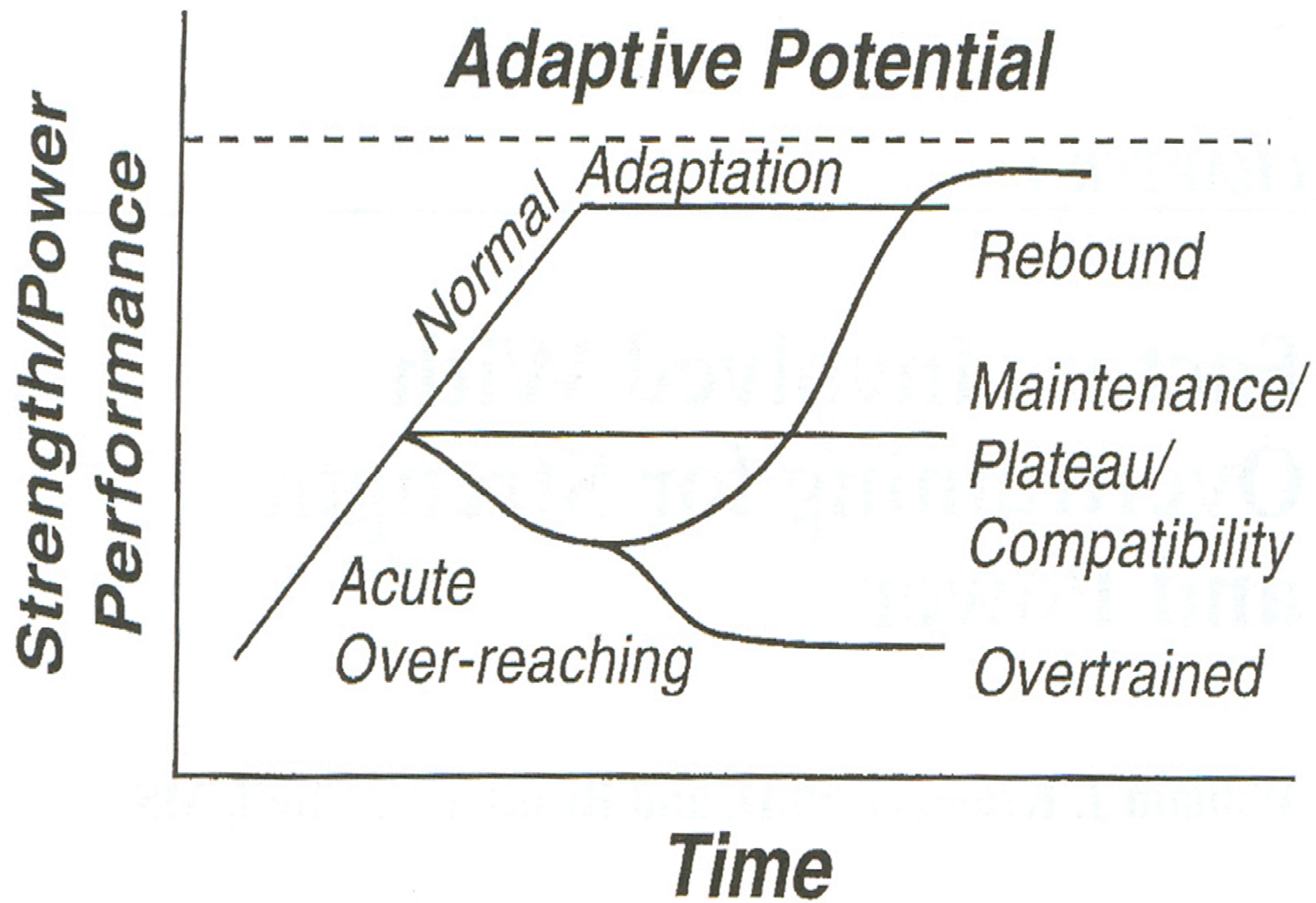
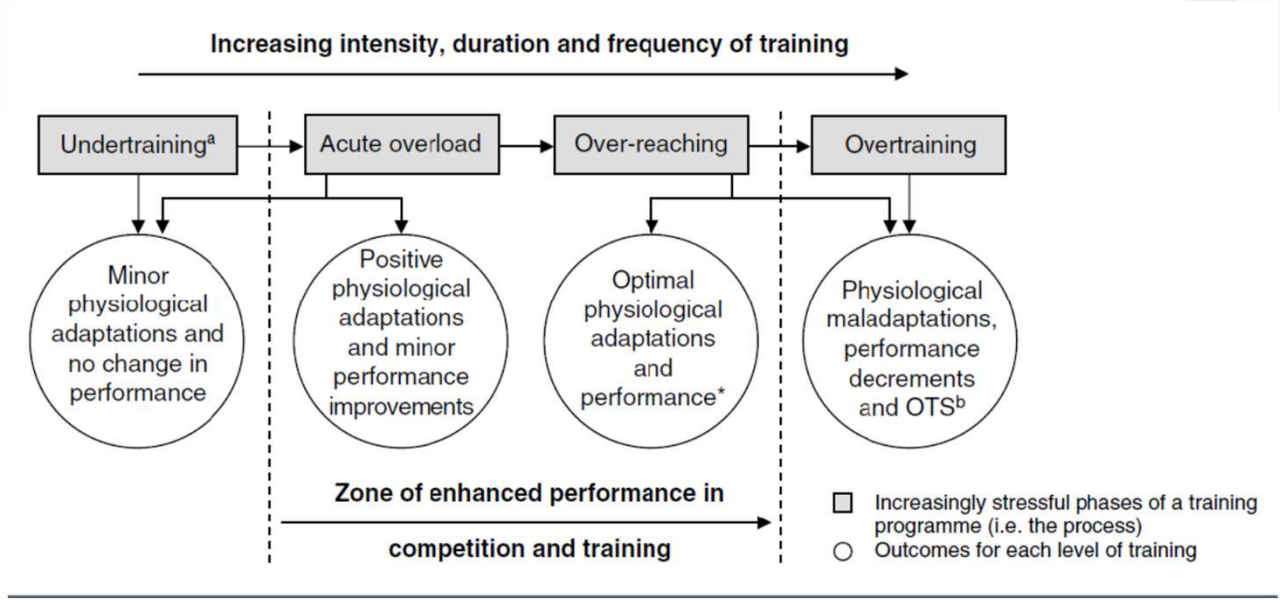
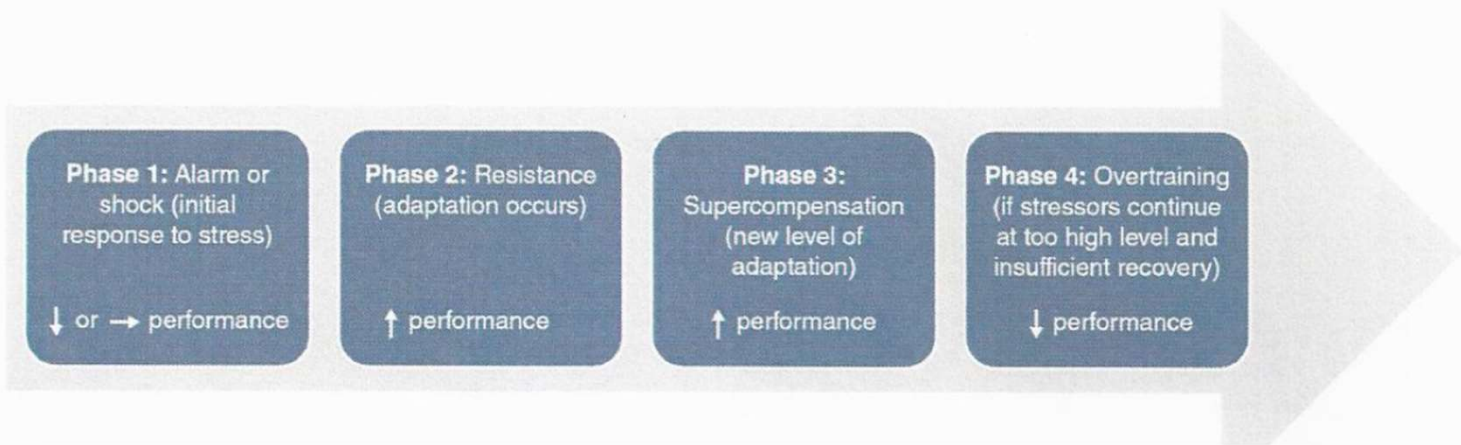


Figure 4.1 Theoretical responses to training in relation to the adaptive potential.



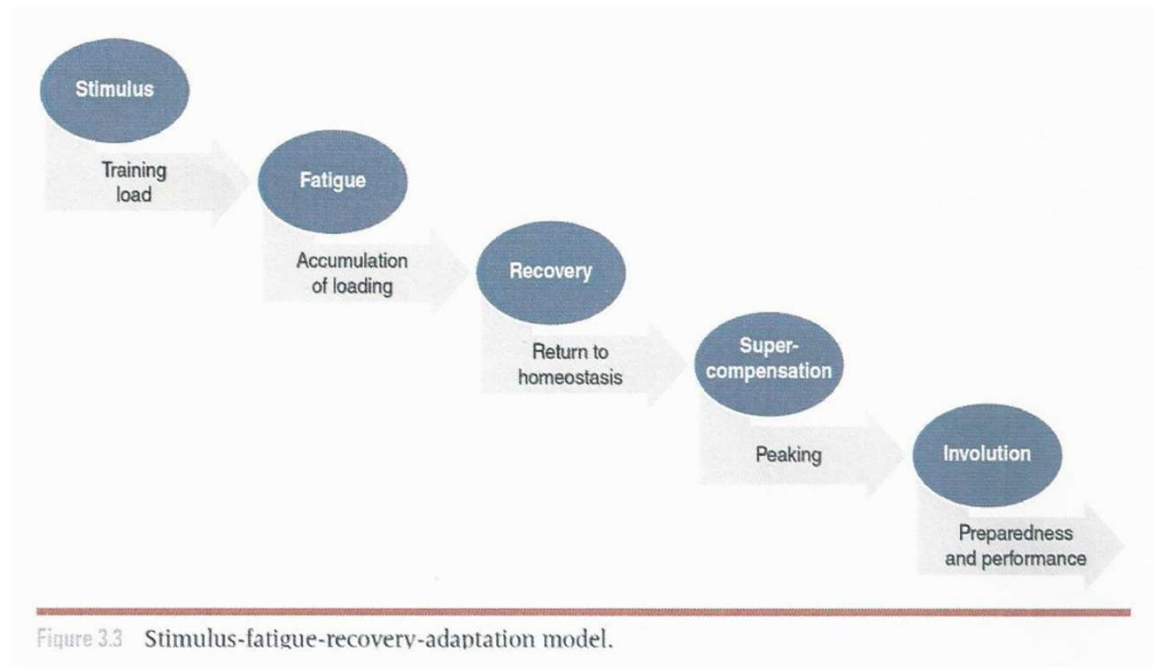


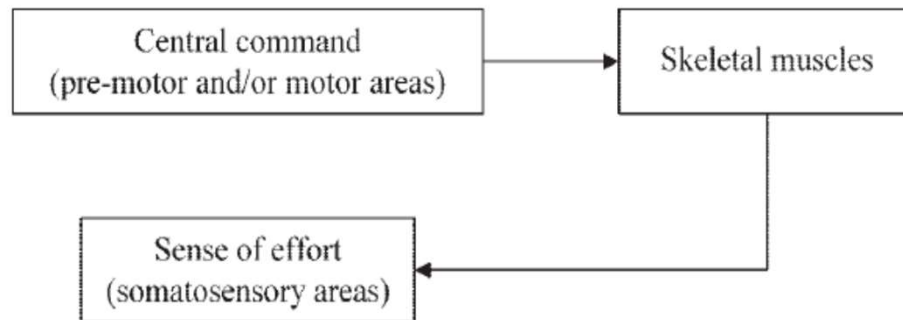
Figure 3.3 Stimulus-fatigue-recovery-adaptation model.

Misure del carico esterno

- Numero degli esercizi
- Carichi sollevati
- Distanze percorse
- Velocità media
- Numero degli sprint (max)
- Numero dei salti
- Numero di impatti
- Numero di accelerazioni e decelerazioni.

RPE (Rate of Perceived exertion) tasso di impegno percepito

A Afferent feedback model of perceived exertion



B Corollary discharge model of perceived exertion

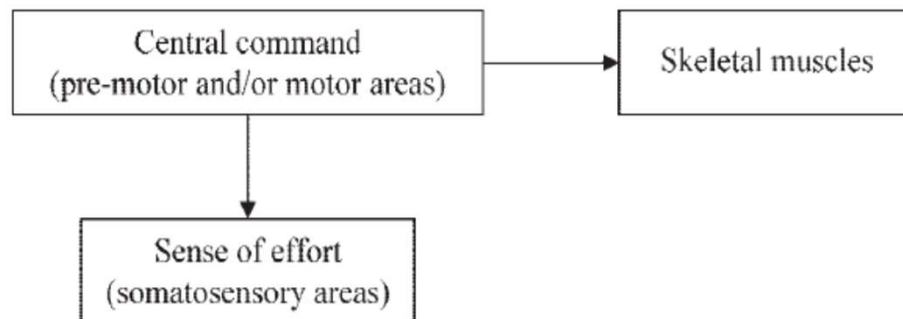
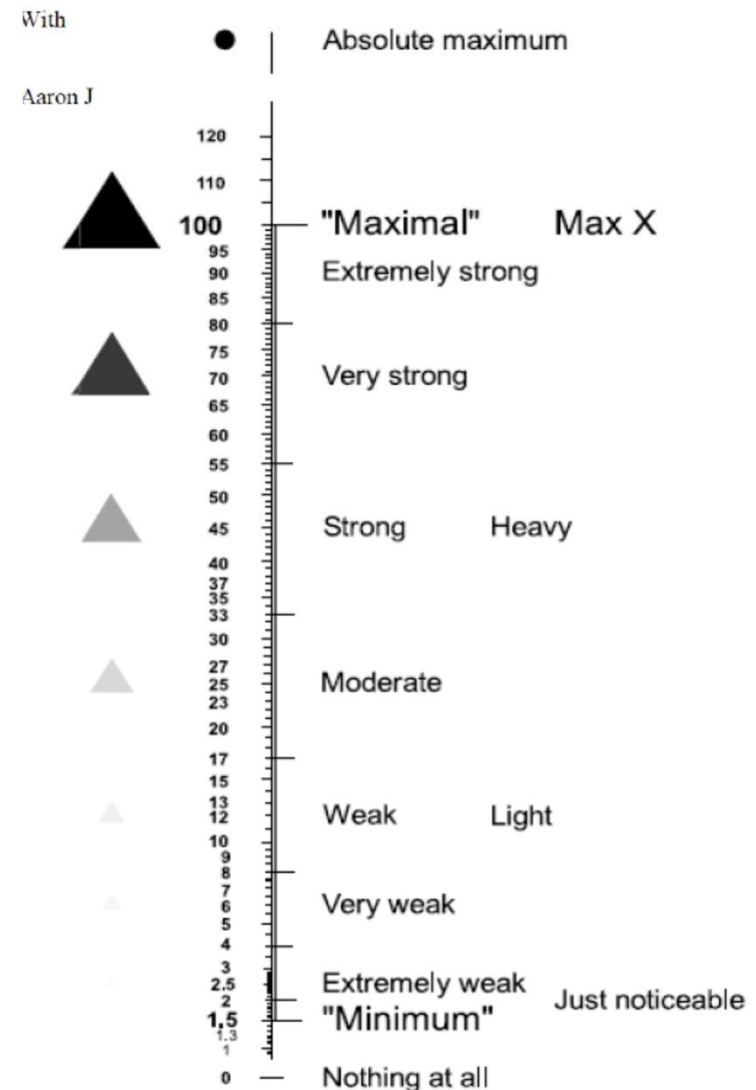


Fig. 1. Simplified afferent feedback (A) and corollary discharge (B) models of perceived exertion.



RPE Rate of Perceived Exertion (1)

- RPE è influenzato:
- Concentrazione degli ormoni
- Rilasci di neurotrasmettitori
- Massa muscolare reclutata
- Concentrazione di substrati
- Stato psicologico (motivazionale, umore, concentrazione)
- Condizioni ambientali
- Tratti di personalità

RPE Rate of Perceived Exertion (2)

- E' una misura soggettiva integra le informazioni provenienti dai muscoli e articolazioni con il cardiocircolatorie e SNC
- Le ricerche hanno dimostrato il legame con il lattato, max V02 e la FC
- La sua efficacia migliora con la pratica per l'atleta
- Vi sono anche scale per la percezione della velocità

RPE Rate of Perceived Exertion (3)

- Sono state testate su diverse parti del corpo
- Durante match di giochi sportivi
- **SESSION RPE** è RPE applicata all'intera sessione e non al singolo esercizio
- Circa 10 minuti dopo la sessione di allenamento
- E 'stato verificato come sensibile anche nei sovraccarichi, distinguendo icarihi elevati da quelli meno

RPE Rate of Perceived Exertion (4)

- Carico di seduta = n° ripet x session RPE
- E' stato validato anche per le varie intensità
- « « per la durata di intervallo
- « « per la densità del carico
- Nei sovraccarichi si è potuto stimare la misura di riserva, cioè quante altre ripetizioni
- Anche nella pliometria e nello sprint

- L'allenamento si realizza attraverso gli esercizi fisico che sono i contenuti del carico di allenamento
- A seconda delle funzioni e modalità di realizzazione gli esercizi provocano adattamenti specifici
- I progressi provocati da tali esercizi fondati su supercompensazione e apprendimenti si concretizza la prestazione

Gli esercizi nella preparazione dell'atleta si possono classificare in della forza del nuotatore

- Esercizi generali
- Esercizi speciali
- Esercizi di gara

La classificazione degli esercizi

- Avviene in funzione della somiglianza (accordo) con l'esercizio di gara sui seguenti elementi:
 - Topografico
 - Dinamico
 - Metabolico
 - Cinesiologico
 - situazionale

Principali tecnologie per il carico esterno

- Analisi del movimento dei movimenti software
- GPS (Global positioning system), con analisi dei risultati
- Sistemi inerziali (accelerometri portatili)
- Misurazioni della potenza (pedane di forza, cicloergometri, piste sensibili, misuratori delle rotazioni e della resistenza da vincere)

Principali tecnologie per la verifica del carico interno

- Percezioni del comportamento
- RPE (scale d'impegno)
- Questionario WELLNESS (VALVA)
- Questionario del recupero (Rest Q)
- Tests di valutazione della forme psychologique
- Questionnaires sur le comportement et sensations quotidiennes (DALDA)
- Etc

Atleta - allenatore

E molto importante armonizzare il rapporto fra l'atleta e l'allenatore, affinché essi possano avere la maggiore affinità nel valutare l'impegno e lo sforzo dell'atleta

Conoscere il carico interno è molto utile per organizzare i tipi di seduta e gli effetti del programma

Chaque athlète a un zone optimale pour élaborer la charge et pour que l'adaptation soit positive.

Il faut la connaître la maîtriser

McGuigan 2017

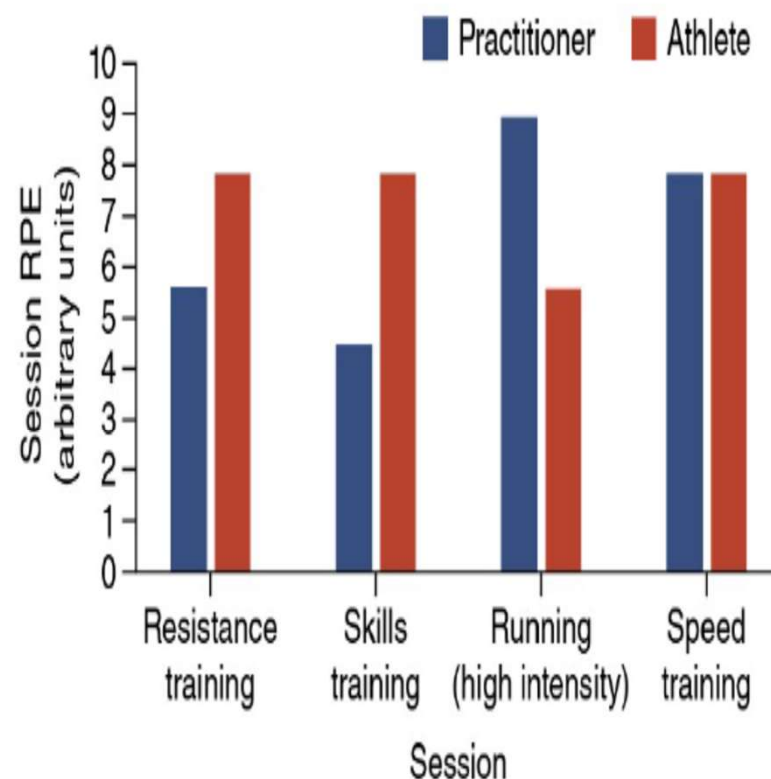
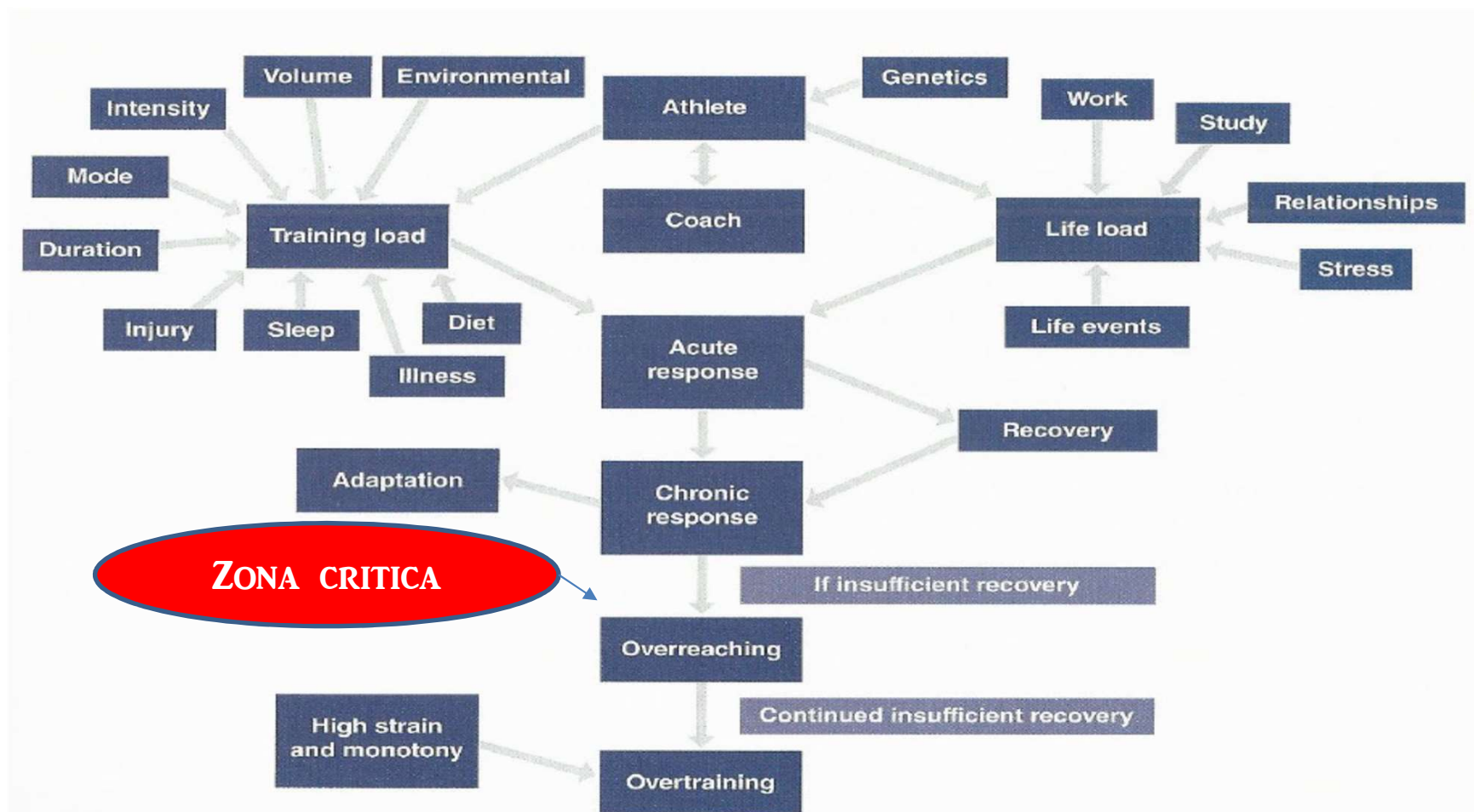


Figure 7.1 A mismatch between an athlete's and practitioner's assessments of session RPE.

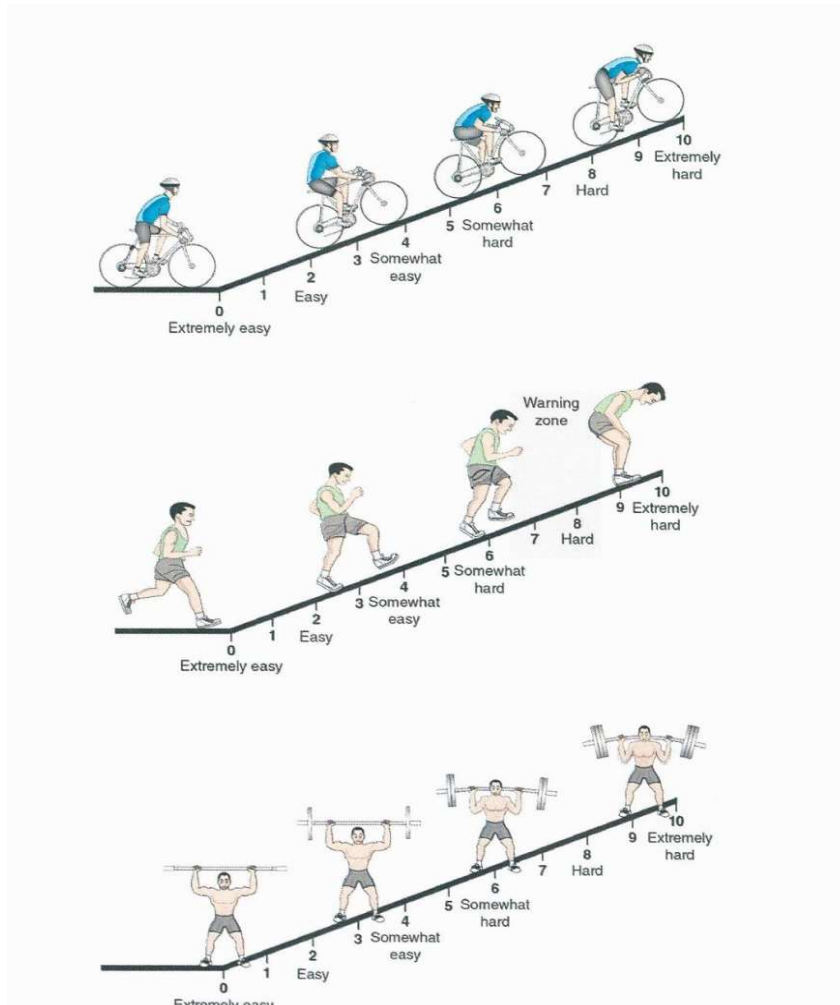
Panorama delle componenti che possono essere monitorate mediante tecnologie elettroniche e « pedagogiche »

ATLETA

AMBIENTE



Utilizzo di scale di impegno (RPE)



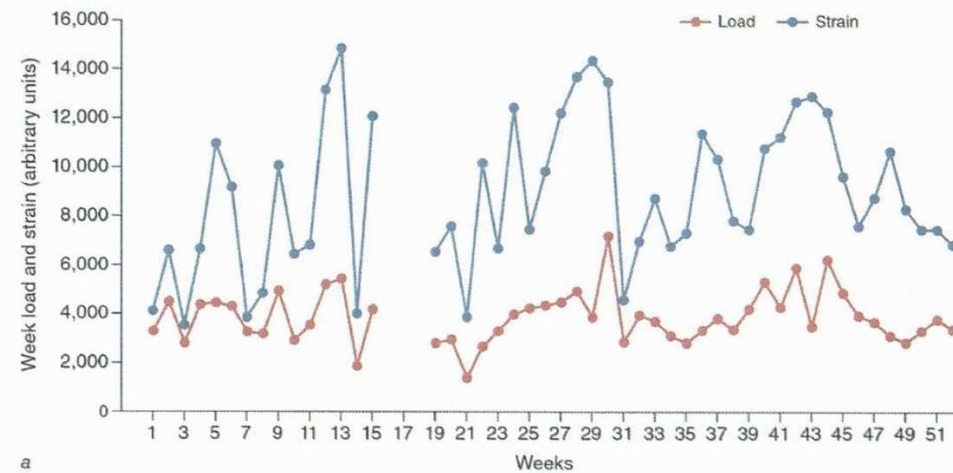
- Le scale di percezione dello sforzo (rate of perceived exertion), possono essere applicate in modo trasversale a tutti i tipi di discipline
- Bisogna personalizzare in quanto gli atleti devono apprendere e descriversi e ad analizzare la propria attività.

La monotonia e lo stress sono un limite all'adattamento

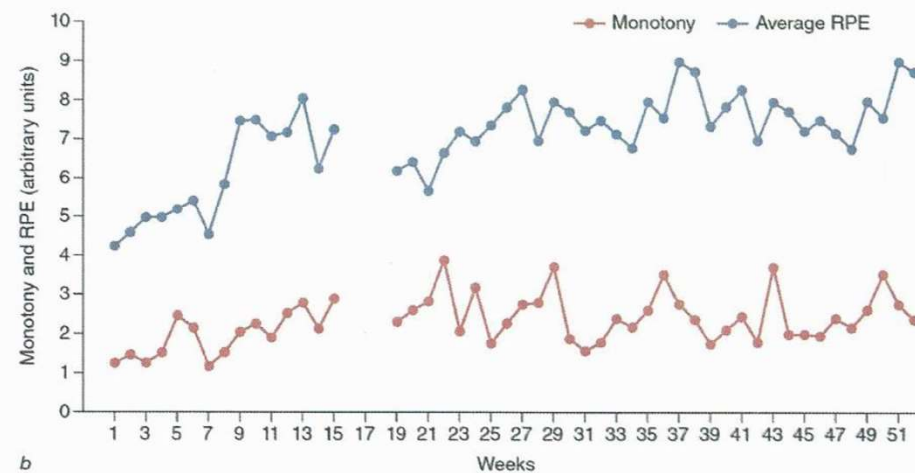
Figure 4.3 Training load, monotony, and strain calculations in an elite athlete.

Day	Session type	Duration (min)	RPE	Session load	Daily average
Monday	Gym	60	6	360	360
Tuesday	Field	120	7	840	645
	Field	75	6	450	
Wednesday	Gym	60	7	420	690
	Field	120	8	960	
Thursday	Track	60	8	480	600
	Field	120	6	720	
Friday	Gym	75	6	450	750
	Field	150	7	1,050	
Saturday	Gym	90	7	630	630
Sunday	Recovery	30	1	30	30
Total weekly load				6,390	
Daily mean load				529.29	
Daily standard deviation				252.00	
Monotony				2.10	
Strain				13,419	

The total weekly load is calculated as the sum of all the session loads. Daily mean load is then calculated by



a



b

Figure 4.4 (a) Training load and strain and (b) monotony and RPE over the course of 1 year for an elite athlete.

Lo stato di benessere facilita la prestazione

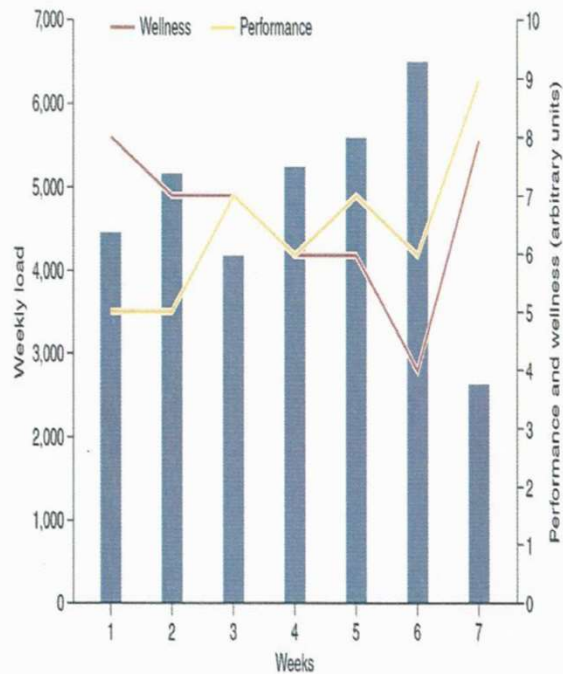


Figure 3.5 Monitoring overreaching in athletes with performance and wellness measures over time (7 weeks) during an overload and taper phase.

Figure 4.7 DALDA questionnaire.

Initials _____ Trial day _____ Date _____

Circle the correct response for this moment: 1 = worse than normal; 2 = normal; 3 = better than normal.

PART A								
1. Diet	1	2	3	6. Climate	1	2	3	
2. Home life	1	2	3	7. Sleep	1	2	3	
3. School/college/ work	1	2	3	8. Recreation	1	2	3	
4. Friends	1	2	3	9. Health	1	2	3	
5. Sport training	1	2	3					
Total								
PART B								
1. Muscle pains	1	2	3	14. Enough sleep	1	2	3	
2. Techniques	1	2	3	15. Recovery between sessions	1	2	3	
3. Tiredness	1	2	3	16. General weakness	1	2	3	
4. Need for a rest	1	2	3	17. Interest	1	2	3	
5. Supplementary work	1	2	3	18. Arguments	1	2	3	
6. Boredom	1	2	3	19. Skin rashes	1	2	3	
7. Recovery time	1	2	3	20. Congestion	1	2	3	
8. Irritability	1	2	3	21. Training effort	1	2	3	
9. Weight	1	2	3	22. Temper	1	2	3	
10. Throat	1	2	3	23. Swellings	1	2	3	
11. Internal	1	2	3	24. Likeability	1	2	3	
12. Unexplained aches	1	2	3	25. Runny nose	1	2	3	
13. Technique strength	1	2	3					
Total								

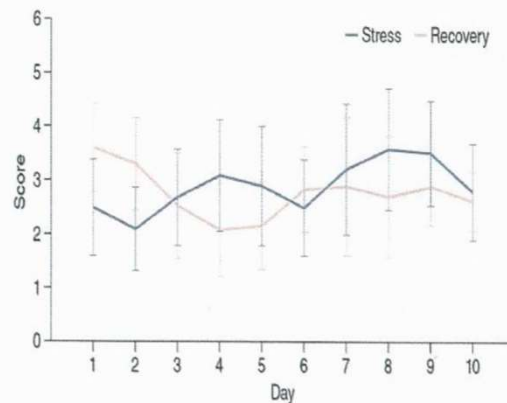
"A tool for measuring stress tolerance in elite athletes," B.S. Bushall, *Journal of Applied Sport Psychology* 2(1): 51-66, 1990 Taylor and Francis, reprinted by permission of the publisher (Taylor & Francis Ltd, <http://www.tandfonline.com>).

REST Q

- Stress éemotionale
- Stress sociale
- Conflits/fatigue de la pression
- mancanza di energia
- dolore fisico
- recupero fisio
- Successo
- ascesa sociale
- qualità del sonno
- Les pauses intactes
- fatica (spossatezza-emozionale)
- Fitness/infortuni
- Fitness/ essere in forma
- Burnout / realizzazione personale
- Auto - efficacia
- Auto- regolazione

Rest Q (Kellmann 2001)

Probabilmente il più efficace ma ha circa 19 sezioni e 76 items che lo rendono troppo lungo. Sono disponibili delle versioni modificate



4.8 Athlete RESTQ-Sport scores over a preseason training phase.

TABLE 4.2 RESTQ-Sport Scale

Scale		Scale summary
1	General stress	Subjects with high values describe themselves as being frequently mentally stressed, depressed, unbalanced, and listless.
2	Emotional stress	Subjects with high values experience frequent irritation, aggression, anxiety, and inhibition.
3	Social stress	High values match subjects with frequent arguments, fights, irritation concerning others, general upset, and lack of humor.
4	Conflicts/pressure	High values are reached if in the preceding few days conflicts were unsettled, unpleasant things had to be done, goals could not be reached, and certain thoughts could not be dismissed.
5	Fatigue	Time pressure in job, training, school, and life; being constantly disturbed during important work; overfatigue; and lack of sleep characterize this area of stress.
6	Lack of energy	This scale matches ineffective work behavior such as inability to concentrate and lack of energy and decision making.
7	Physical complaints	Physical indisposition and physical complaints related to the whole body are characterized by this scale.
8	Success	Success, pleasure at work, and creativity during the past few days are assessed in this area.
9	Social recovery	High values are shown by athletes who have frequent pleasurable social contacts and change combined with relaxation and amusement.
10	Physical recovery	Physical recovery, physical well-being, and fitness are characterized in this area.
11	General well-being	Besides frequent good moods and high well-being, general relaxation and contentment are also in this scale.
12	Sleep quality	Enough recovering sleep, an absence of sleeping disorders while falling asleep, and sleeping through the night characterize recovery sleep.
13	Disturbed breaks	This scale deals with recovery deficits, interrupted recovery, and situational aspects that get in the way during periods of rest (e.g., teammates, coaches).
14	Burnout/emotional exhaustion	High scores are shown by athletes who feel burned out and want to quit their sport.
15	Fitness/injury	High scores signal an acute injury or vulnerability to injuries.
16	Fitness/being in shape	Athletes with high scores describe themselves as fit, physically efficient, and vital.
17	Burnout/personal accomplishment	High scores are reached by athletes who feel integrated in their team, communicate well with their teammates, and enjoy their sport.
18	Self-efficacy	This scale is characterized by how convinced the athlete is that he/she has trained well and is optimally prepared.
19	Self-regulation	The use of mental skills for athletes to prepare, push, motivate, and set goals for themselves are assessed by this scale.

Reprinted, by permission, from M. Kellmann and K.W. Kallus, 2001, *Recovery-stress questionnaire for athletes: User manual* (Champaign, IL: Human Kinetics), 6-7.

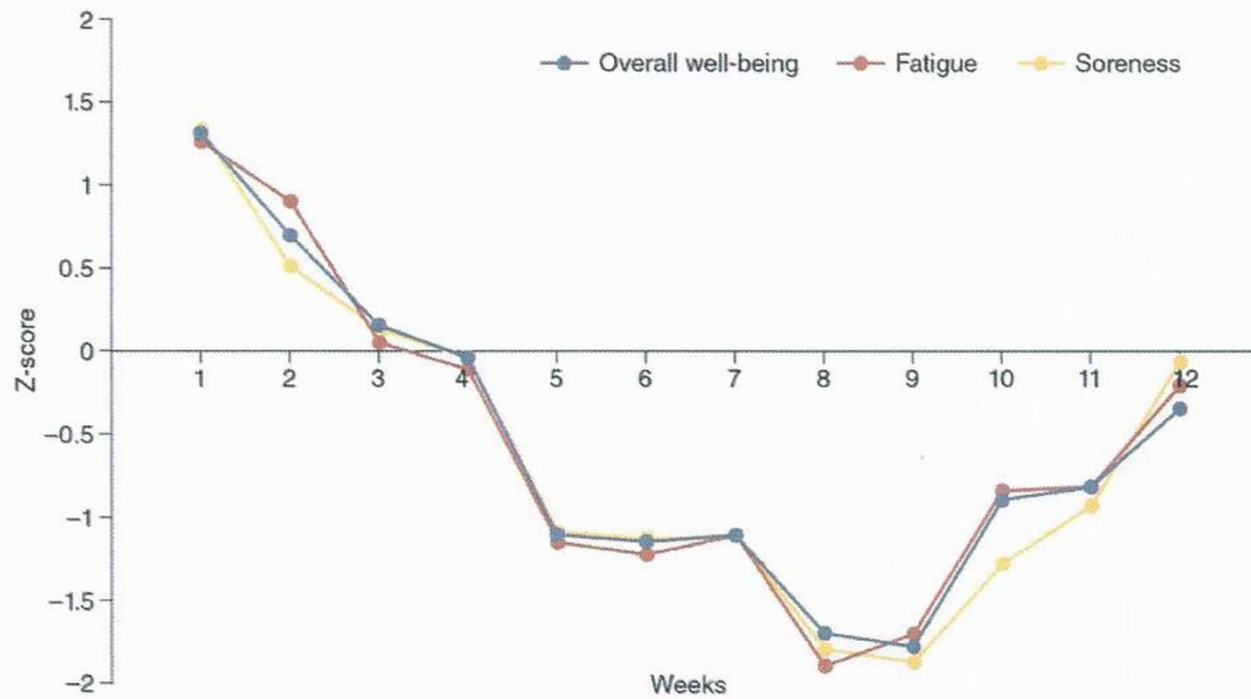
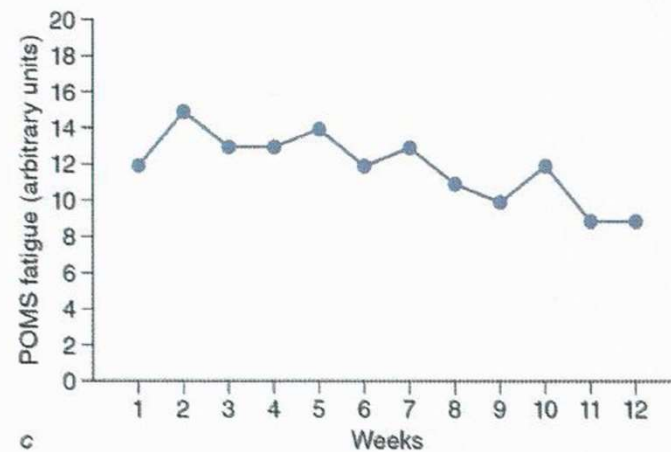
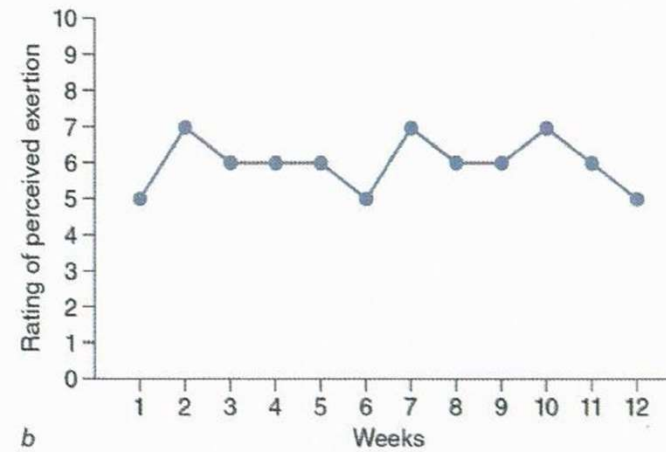
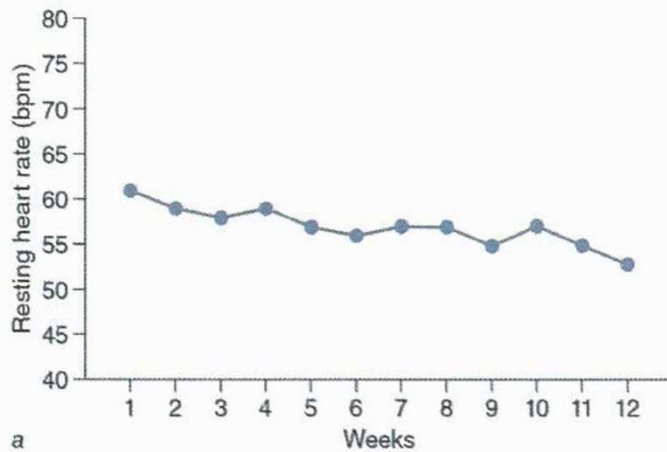


Figure 4.9 Tracking wellness in a training camp using composite wellness scores and identifying red flags.

Monitoraggio dello stress, della percezione dello sforzo e modifiche dell'umore



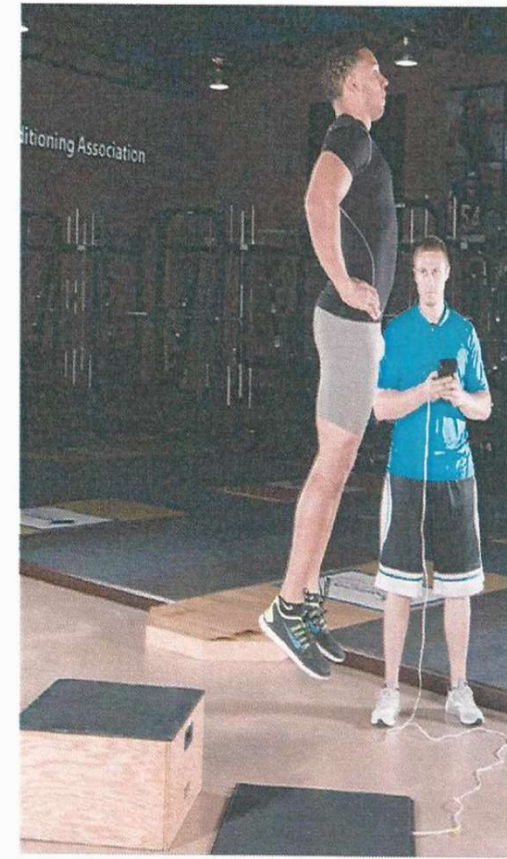
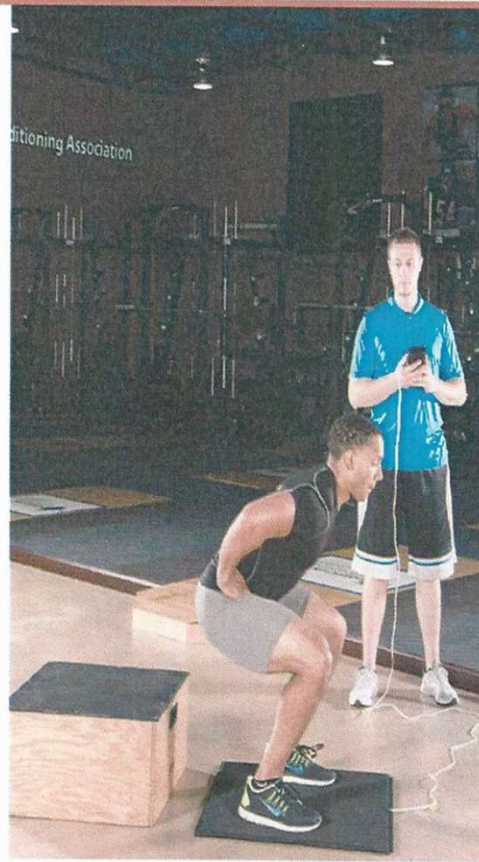
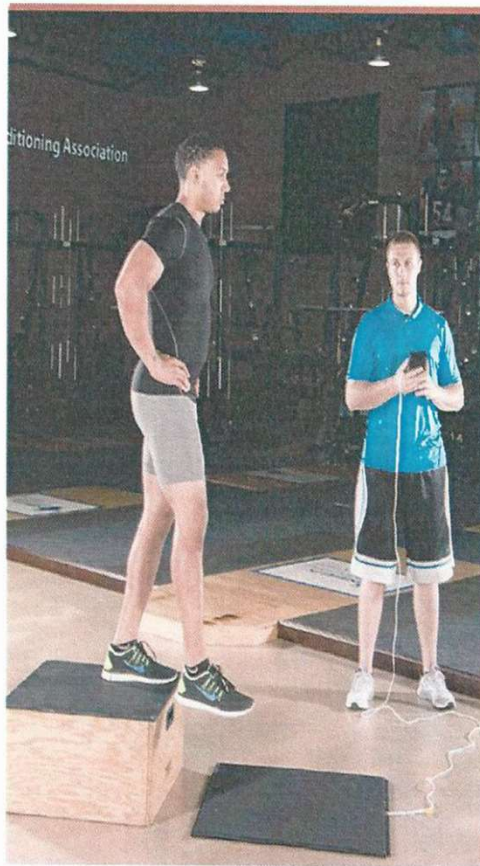
Monitoraggio ormonale

TABLE 5.1 Functions, Advantages, and Disadvantages of Primary Hormonal and Biochemical Markers

Marker	Function	Advantages	Disadvantages
Testosterone and cortisol	May indicate anabolic and catabolic balance.	Can be measured in saliva and blood. One of the simplest assays.	Analysis is costly. Variability is high.
Epinephrine and norepinephrine	Have important roles in force production, energy availability, and muscle contraction.	Indicate response to stress and reflect acute demands of exercise.	Require blood samples. Analysis is complicated and expensive.
Growth hormone	Has a role in anabolic status and a wide range of metabolic functions.	Can indicate differential response to forms of exercise.	Requires blood sample. Analysis is complicated and expensive.
IGF-1 and IGFBP-3	Involved with anabolism of bone and skeletal muscle.	Can be measured in saliva and blood. IGFBP-3 may be reflective of training load.	Analysis is complicated and expensive.
Glutamine and glutamate	Glutamine-to-glutamate ratio indicates excessive training stress.	Are potential biochemical markers of overreaching.	Require blood samples. Analysis is costly and time consuming.
Creatine kinase	Provides information on muscle damage.	Has been widely researched, and evidence exists for its utility during periods of heavy training loads.	Requires a blood sample. Analysis is costly and time consuming. Degree of variability is high.
Hematological measures	Are standard clinical tests of red blood cell count, hemoglobin, and leukocyte count.	Are useful for determining health status.	Require a blood test. Have low utility for determining overreaching and overtraining.

Data from Gleeson et al. (80); Meeusen et al. (145); Urhausen et al. (203); Viru and Viru (208).

La fatica neuromuscolare



Diffusione delle tecnologie e modalità di controllo dell'allenamento (McGuigan2017)

TABLE 6.1 Common Athlete Monitoring Practices

Monitoring variable	Level of use	Level of evidence	Practical value
GPS and accelerometry	High	Moderate	Moderate to high
RPE	High	High	High
Wellness questionnaires	High	High	High
Biochemical and hormonal markers	Low	Moderate	Low
Heart rate measures	High	Moderate to high	Moderate to high
Performance tests	Moderate	Moderate	Moderate
Movement screening	High	Low	Moderate
Neuromuscular assessments (e.g., jumps)	Moderate	Moderate	Moderate

Based on published reports from Akenhead and Nassis (3), McCall et al. (94), Saw et al. (127), and Taylor et al. (141).

principali obiettivi del monitoraggio della crescita della prestazione finalizzati allo sviluppo delle sue componenti

- Realizzazione della forma sportiva, la sua gestione (ottenimento,, mantenimento, perdita)
- Tappe della realizzazione della realizzazione degli obiettivi intermedi
- La programmazione deliberata, supervisiona e permette gli eventuali aggiustamenti
- Le prove tecnologiche, migliorano e facilitano il controllo e la verifica

Come evitare la syndrome di superallenamento e la diminuzione della prestazione (1)

La prevenzione è la strategia più importante per trattare la sindrome da superallenamento

Il monitoraggio dell'atleta può evitare la sindrome da superallenamento in diversi modi :

- Avare colloqui regolari con gli atleti athlètes
- Tenere un diario di allenamento per annotare anche i vari dettagli
- Fare degli aggiustamenti del carico di allenamento quando il rendimento diminuisce.
- Aumentare progressivamente il carico di allenamento pianificato per evitare disagi con improvvisi aumenti.
- Évitare la monotonia eccessiva alternando carichi epesanti e carichi leggeri.

Come evitare la syndrome di superallenamento e la diminuzione della prestazione (2)

- Utilizzo intelligente dei giorni di riposo
- Evitare la noia e la monotonia.
- Individualizzare i carichi di allenamento
- Analizzare altri fattori che possono influenzare (es. gli esami scolastici e universitari e le relazioni personali).
- Ruolo delle condizioni ambientali : calore, altitudine, jet-lag
- Ottimizzare il recupero
- Strategie nell'utilizzo del sonno e del recupero
- Assicurare una alimentazione adéguata ed equilibrata
- Utilizzare i questionari di wellness per monitorare gli stati psicologici ed emozionali degli atleti
- Effettuare degli aggiustamenti dei carichi di allenamento e della frequenza.



Figure 6.3 An athlete performing a punch while a wearable device collects velocity data.



Figure 6.4 An athlete performing a bench press while a wearable device collects velocity data.



Figure 6.5 An athlete performing a sprint while a wearable device collects velocity data.

Monitoraggio del carico interno con mezzi chimich biochimici e ormonali (finalità, vantaggi , svantaggi) Da McGuigan (2017)

Biochimique

- Créatinekinase
- Alpha Amylase
- Hypoxantine
- Globuli rossi
- Immunologia
- Cytocine

TABLE 5.1 Functions, Advantages, and Disadvantages of Primary Hormonal and Biochemical Markers

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Modello di prestazione

- Determinazione di un modello di performance specifica di ogni disciplina sportiva
- Analisi della performance in competizione, nell'allenamento, nella squadra e in interazione
- Livello delle qualità fisiche, della spesa energetica, delle variazioni funzionali.
- Descrizione cinematica et dinamica
- Frequenze delle ripetizioni delle tecniche e tattiche
- Comportamenti in condizioni di fatica.

.

En traîneurs et technologies



Figure 6.4 An athlete performing a bench press while a wearable device collects velocity data.



**Gli allenatori di fronte alla tecnologia
Devono porsi le seguenti domande**

Quali tecnologie saranno disponibili in futuro?

Che tipo di informazioni sono utili per gli atleti?

Come le informazioni prodotte dalla tecnologia avanzata consentono il miglioramento delle prestazioni.



L'uso delle nuove tecnologia ha bisogno di un tempo di apprendimento. A volt può Essene utile A fare degli investimenti, anch ' io se piccoli, acquisendoli

-
- Affidabilità, validità e sensibilità della tecnologia
- Quali ricerche li validano?
- Valutare i costi attuali e futuri e sviluppo sostenibile
- Livello di invasività
- Quali feedback viene dato al Coach E in quanto tempo?
- Quali decisioni può prendere il allenatore con questi feedback?
- Affidabilità delle informazioni
- Quanti atleti sono coinvolti?
- Registrazione dei dati
- Fonti energetiche e autonomia dei depositivi tecnologici
-

Elaborazione di informazioni relative agli strumenti tecnologici



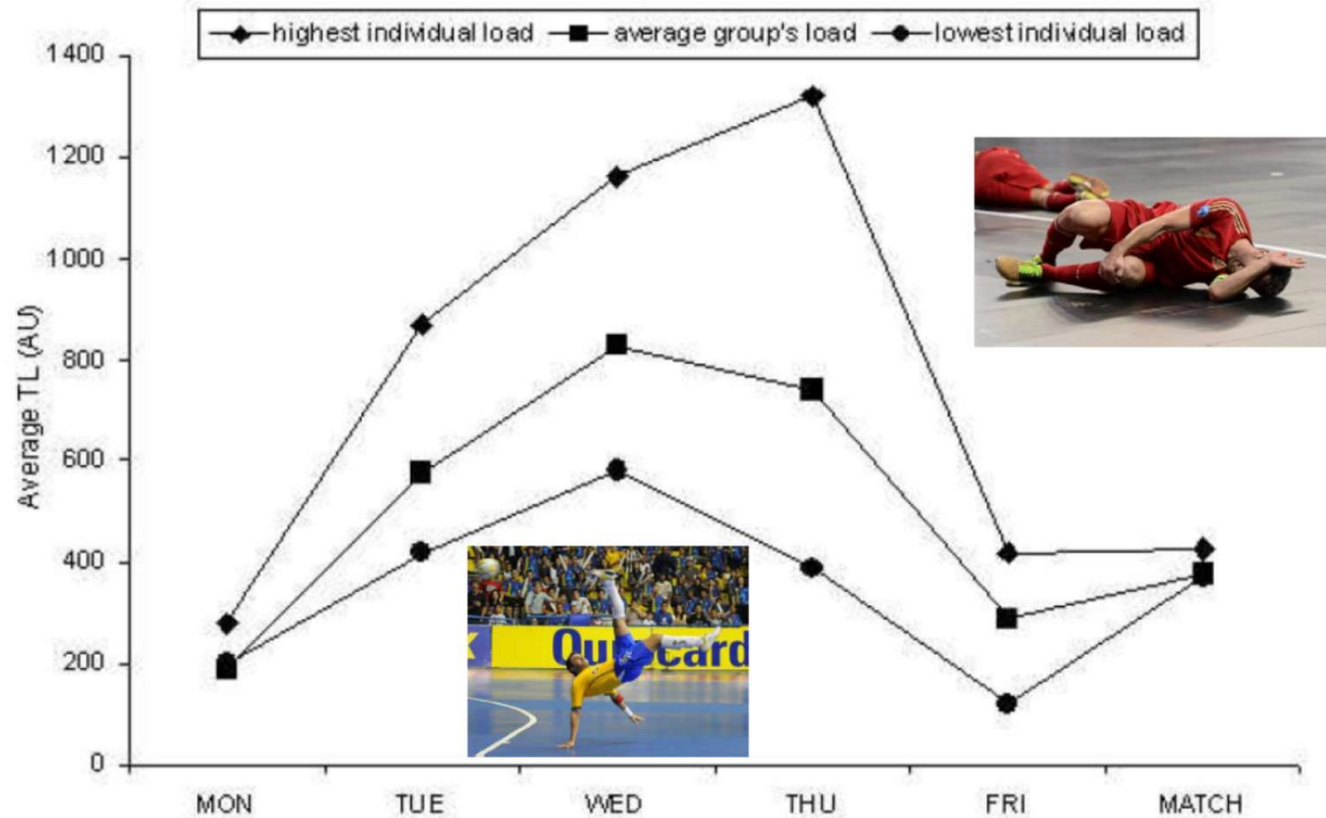
Come possiamo evitare le difficoltà future?



Gli attrezzi devono essere robusti
Facile da usare
Dovrebbero essere facili da capire
anche per gli atleti
Dare un rapido feedback
Elaborazione dati veloce
Fornire dati essenziali
Essere nelle possibilità di bilancio
dell'organizzazione
Meglio se applicabile a diversi atleti e
altri sport
Non richiedono troppe persone per il
loro uso.

Discipline sportive

Players feel differently to similar ETL



PROFILE OF WEEKLY TRAINING LOAD IN ELITE MALE PROFESSIONAL BASKETBALL PLAYERS

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¹Faculty of Medicine and Surgery, School of Sport and Exercise Sciences, University of Rome Tor Vergata, Rome, Italy; ²Neuromuscular Research Laboratory, Schulthess Klinik, Zurich, Switzerland; and ³Tunisian Research Laboratory of "Sports Performance Optimization," National Center of Medicine and Science in Sports, Tunis, Tunisia

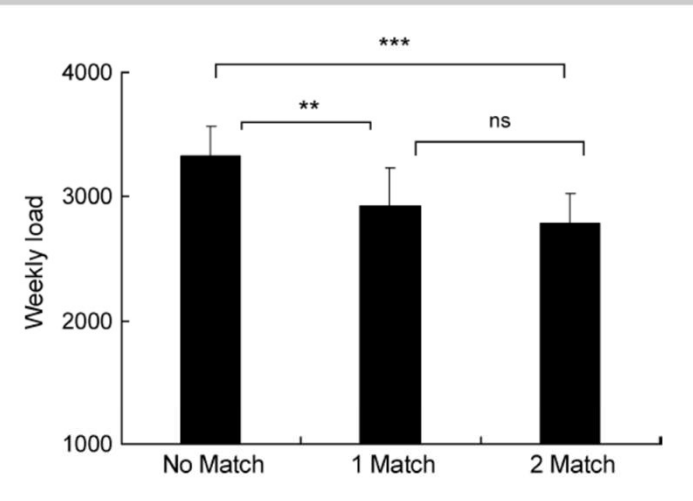


Figure 3. Comparison among weekly training loads during the control (no game) and 1- and 2-games a week training microcycles ($n = 8$, 200 observations).

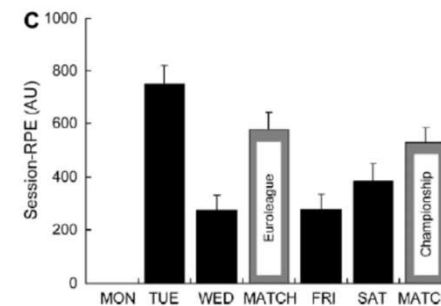
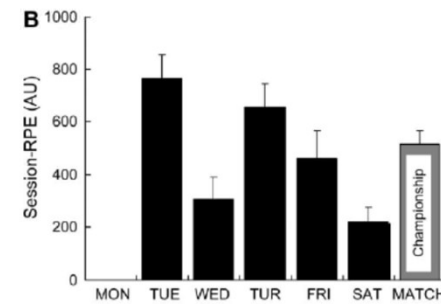
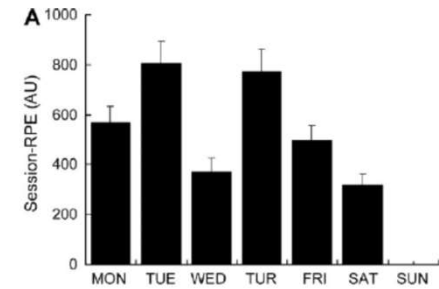
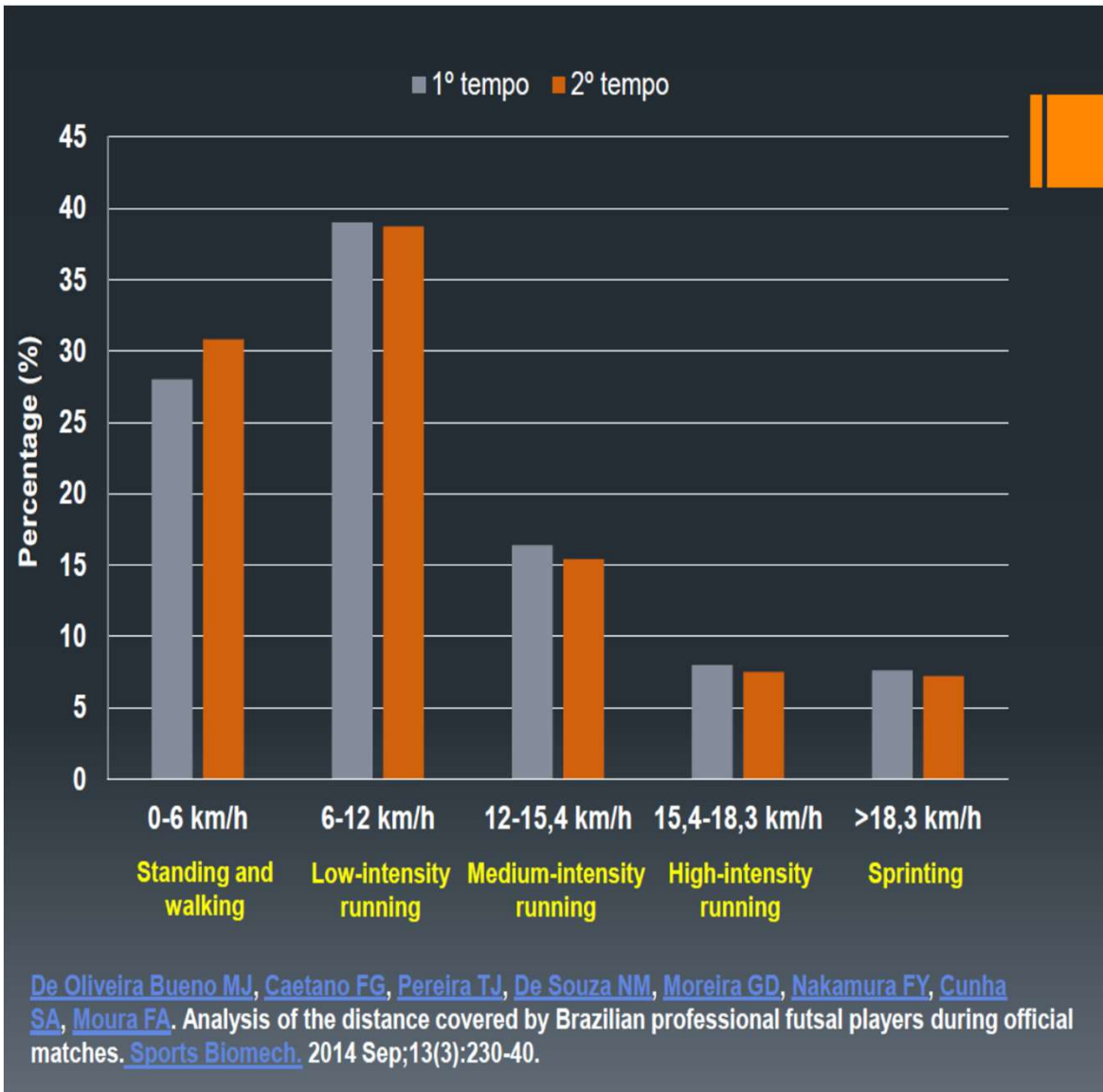


TABLE 1. Training activities undertaken by players during the championship weeks monitored.

Day	Training activity		
	No game	1 Game	2 Games
Monday	Technical/tactical	Rest	Rest
Tuesday	Strength training + technical	Strength training + technical	Explosive weights + technical
Wednesday	Technical/tactical	Technical/tactical	Tactical
Thursday	Explosive weights + technical	Explosive weights + technical	Game
Friday	Technical/tactical	Technical/tactical	Tactical
Saturday	Tactical	Tactical	Technical/tactical
Sunday	Rest	Game	Game
Weekly load	3,334	2,928	2,791
Monotony (mean weekly load/ <i>SD</i>)	1.70	1.59	1.62
Strain (load × monotony)	5,678	4,666	4,534



High-intensity run

♂ 19.8 – 25.0 km/h

♀ 15.6 – 20.0 km/h

Sprint

♂ >25.0 km/h

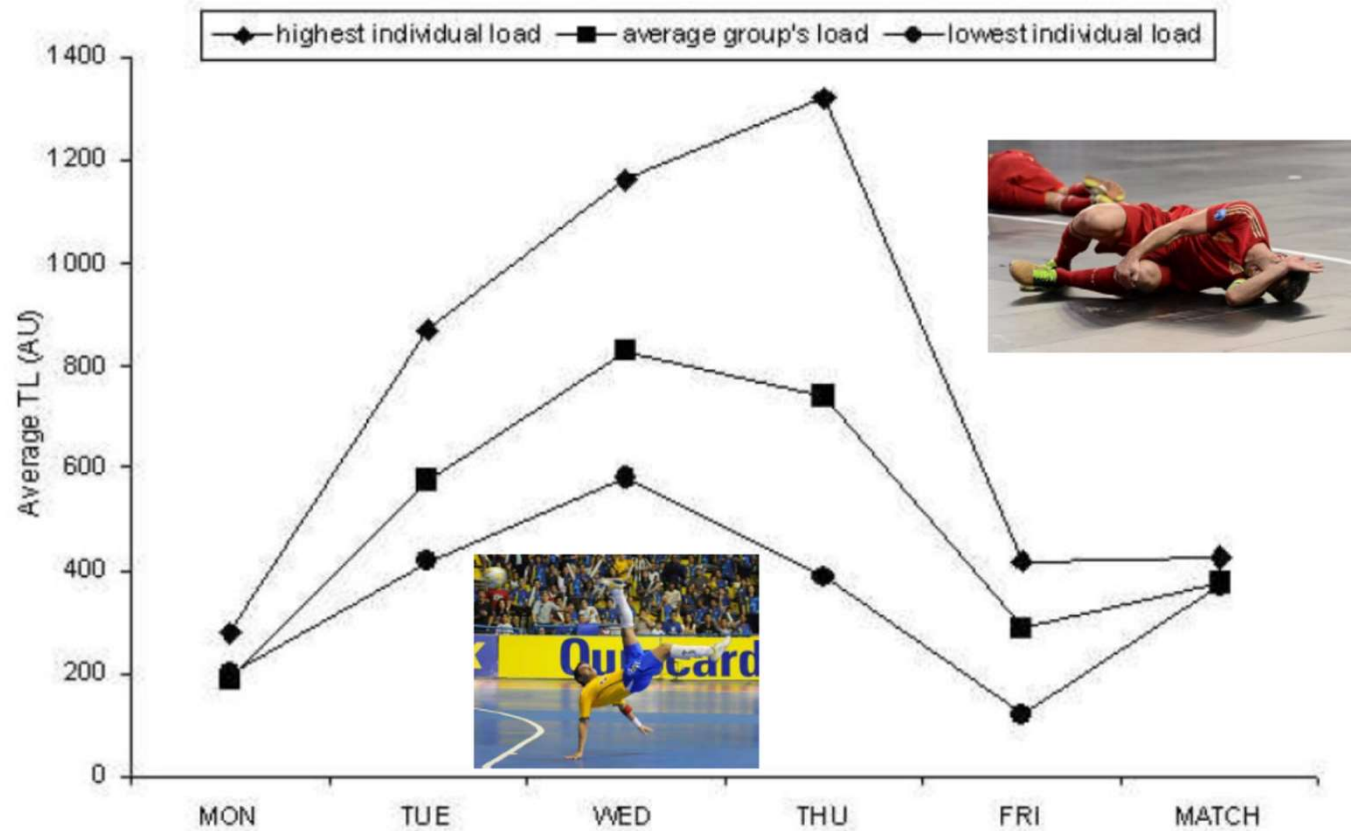
♀ >20.0 km/h

Player name: Athlete A
Position: Center (netball)
Session type: Team training

Measure (units)	Target	Result
Duration (minutes)	60	63
Distance at speed >5 m/s (meters)	500	577
External load metric (arbitrary units)	700	719
Accelerations (number)	50	57
Heart rate at 85-96% (% of session duration)	80	84

Comments: All targets achieved for the training session. No extra work required.

Players feel differently to similar ETL



PROFILE OF WEEKLY TRAINING LOAD IN ELITE MALE PROFESSIONAL BASKETBALL PLAYERS

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¹Faculty of Medicine and Surgery, School of Sport and Exercise Sciences, University of Rome Tor Vergata, Rome, Italy; ²Neuromuscular Research Laboratory, Schulthess Klinik, Zurich, Switzerland; and ³Tunisian Research Laboratory of "Sports Performance Optimization," National Center of Medicine and Science in Sports, Tunis, Tunisia

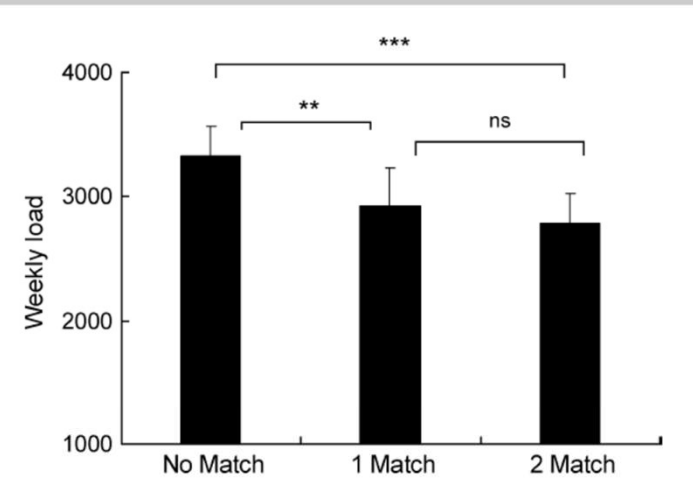


Figure 3. Comparison among weekly training loads during the control (no game) and 1- and 2-games a week training microcycles ($n = 8$, 200 observations).

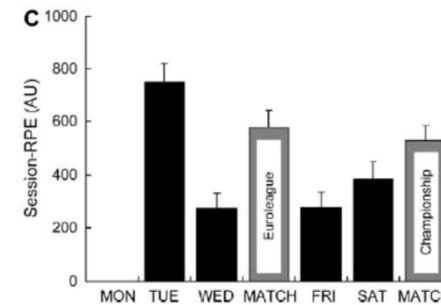
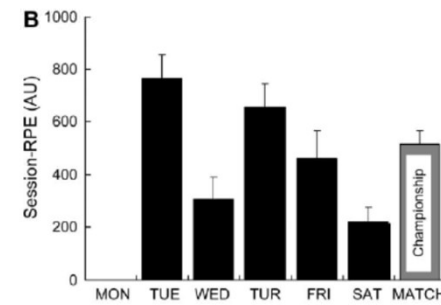
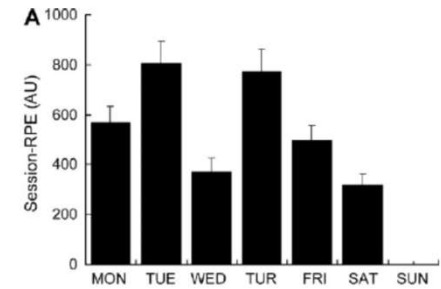


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Weekly load	3,334	2,928	2,791
Monotony (mean weekly load/ <i>SD</i>)	1.70	1.59	1.62
Strain (load × monotony)	5,678	4,666	4,534

Key recommendations

- High monotony and strain but responding well
- Continue to monitor along with acute to chronic workload

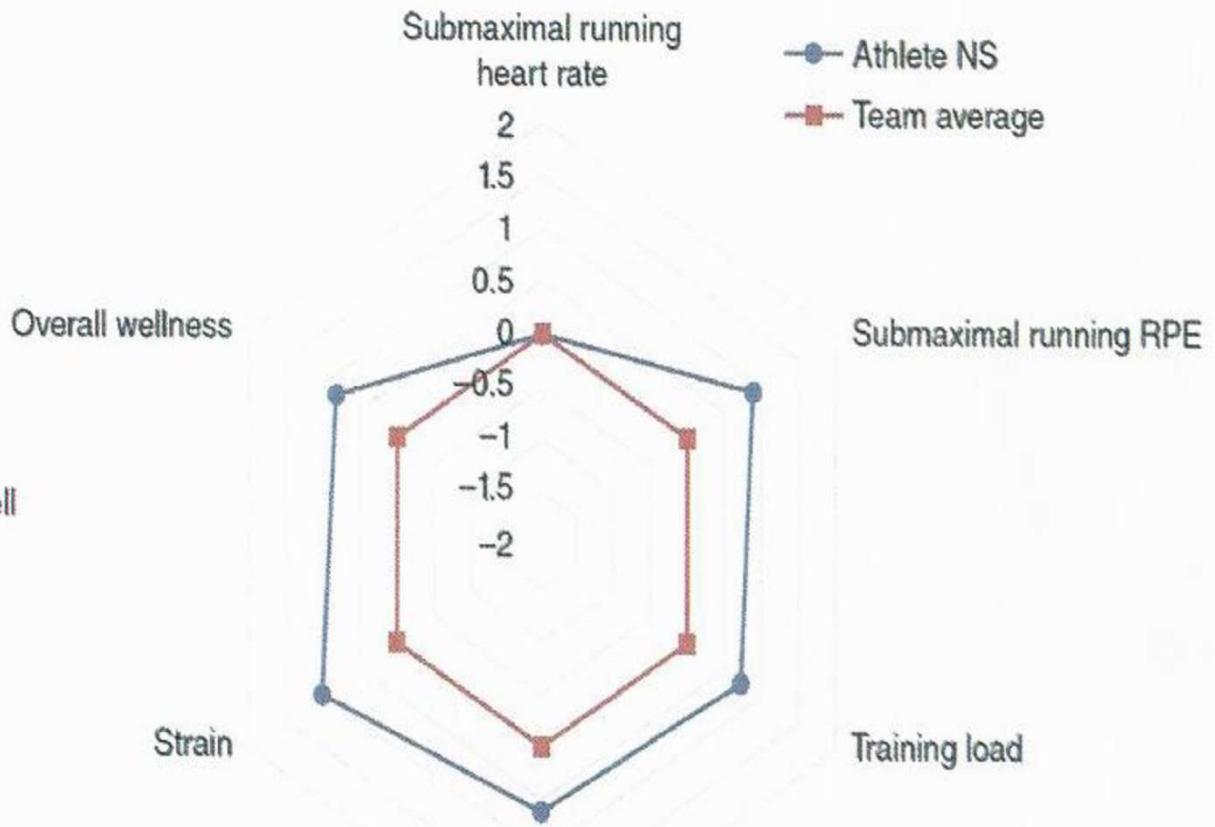


TABLE 9.2 Monitoring System for Football

Variable	Assessment frequency	Purpose	Analysis method	Practical interpretation
Session RPE	Every session	Measure of perceived exertion of training session	Z-score relative to baseline measure	Z-score ≤ -1.5
Training load	Weekly	Measure of internal load	<ul style="list-style-type: none"> • Z-score relative to baseline measure • Acute-to-chronic ratio 	<ul style="list-style-type: none"> • Z-score ≤ -1.5 • Acute-to-chronic ratio ≥ 1.5 is a yellow flag; ≥ 2.0 is a red flag
Monotony	Weekly	Measure of sameness and variation of training	Z-score relative to baseline measure	Z-score ≤ -1.5
Strain	Weekly	Measure of overall product of training load and monotony	<ul style="list-style-type: none"> • Z-score relative to baseline measure • Acute-to-chronic ratio 	<ul style="list-style-type: none"> • Z-score ≤ -1.5 • Acute-to-chronic ratio ≥ 1.5 is a yellow flag; ≥ 2.0 is a red flag
Wellness (questionnaire)	Twice per week	Measure of overall wellness and quality of sleep, muscle soreness, fatigue, and stress	<ul style="list-style-type: none"> • Z-score relative to baseline measure • Change in raw score for individual items 	Z-score ≤ -1.5 ± 2 on individual item = positive or negative change
Vertical drop jump (jump height and contact time)*	Daily	Measure of neuromuscular fatigue	<ul style="list-style-type: none"> • Z-score relative to baseline measure • Smallest meaningful change relative to reliability 	<ul style="list-style-type: none"> • Z-score ≤ -1.5 • If contact time or jump height decreases greater than smallest meaningful change, investigation is needed.
Submaximal running test (average heart rate and RPE)	Every 2 weeks	Measure of running performance and fatigue	<ul style="list-style-type: none"> • For heart rate: z-score relative to baseline measure • For RPE: change in raw score 	Z-score $\leq -1.5 \pm 2$ on RPE scale = positive or negative change

*If a contact mat or similar technology is not available, the drop jump could be replaced with a vertical countermovement jump.

TABLE 9.1 Jump Monitoring for a Volleyball Athlete

Day	Training load (number of jumps)
Monday	600
Tuesday	935
Wednesday	805
Thursday	225
Friday	875
Saturday	400
Sunday	0
Total weekly load	3,840.0
Daily mean load	548.6
Daily standard deviation	354.0
Monotony	1.55

Figure 9.3 Weekly monitoring report for team coach and practitioner.

Sport: Soccer

Athlete	Submaximal running test (% maximal heart rate)	Submaximal running test (RPE)	Training load (arbitrary units)	Monotony (arbitrary units)	Strain (arbitrary units)	Overall wellness score*	Fatigue *	Stress *	Soreness *	Sleep *
NS	83	6	6,390	2.10	13,421	7.5	8	6	8	8
TP	81	3	5,565	1.94	10,814	6	6	6	6	6
MN	89	7	5,470	2.22	12,135	5	4	6	6	4
SC	77	5	3,880	1.89	7,316	8.5	8	10	8	8
JP	80	4	5,415	1.87	10,131	7.5	8	8	6	8
MR	81	4	5,910	1.62	9,576	8	8	8	8	8
AB	86	4	5,355	2.22	11,877	6	6	6	6	6
FT	84	3	4,675	2.14	9,993	4.5	4	6	4	4
JH	87	7	6,080	2.09	12,724	6	6	6	6	6
CJ	82	4	6,640	1.88	12,499	7	8	6	8	6
SM	DNC	DNC	1,500	1.81	2,716	4.5	6	4	4	4
Mean	83	4.7	4,740	1.98	9,434	6.41	6.55	6.55	6.36	6.18
Standard deviation	3.59	1.49	2,238	0.19	4,164	1.39	1.57	1.57	1.50	1.66

*Rating number is on a 1-10 scale.

DNC = did not complete

Summary: Red flags (results in bold) are identified for individual athletes and specific tests. Monotony and strain were high for the week, and overall sleep quality was lower than in previous weeks. In an actual report, practitioners would click on an athlete's initials for a graph of individual results.

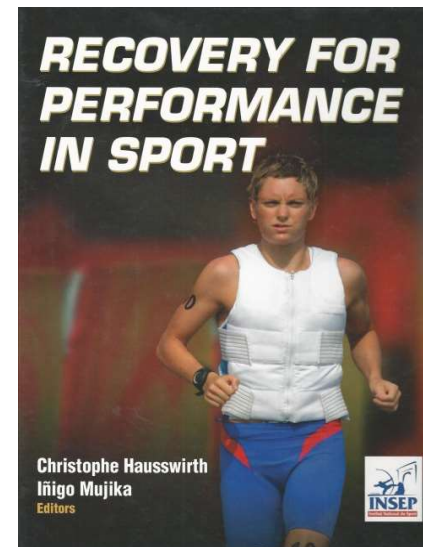
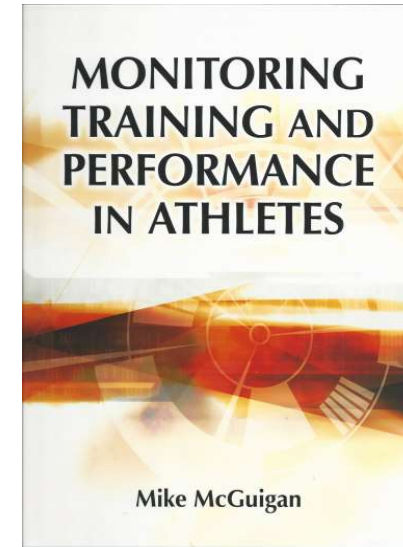
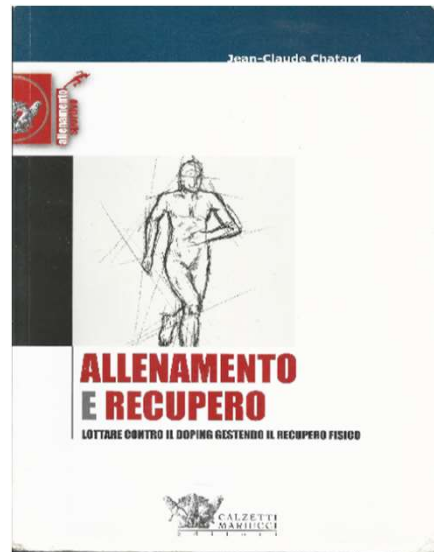
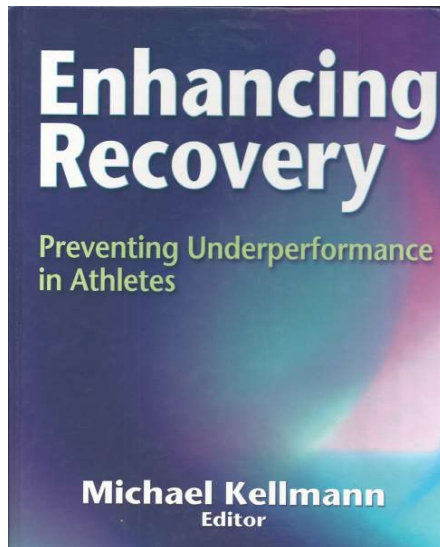
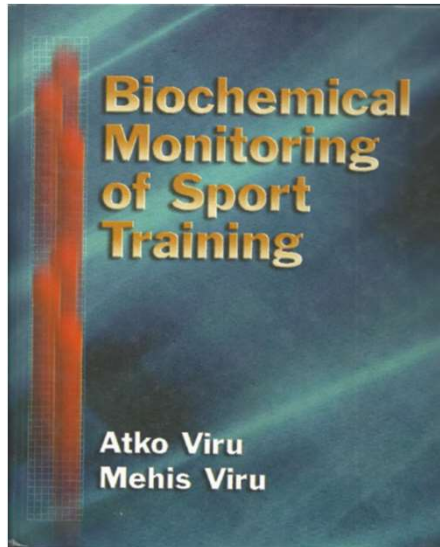
Dove trovare informazioni

Revue internationale d'exercices physiques et de sport

- Secondo il sito Sportscience (sportsci.org) esistono :
- 126 riviste internazionali che si occupano di *Esercizio Educazione fisica e Sport*
- 94 di queste hanno *l'Impact Factor*
- 55 riviste hanno la parola *Sport* nel titolo
- La maggioranza di queste sono presenti su PUB MED

Title	2013	2014	2015	2016
Sports Medicine Review	6,0	5,9	5,8	6,8
Exercise and Immunology Review	6,2	5,7	3,6	6,4
American Journal of Sports Medicine	4,7	4,9	5,1	5,0
International J of Behavioral Nutrition & Physical Activity	4,6	5,1	4,9	5,0
British Journal of Sports Medicine	3,4	3,7	4,5	4,9
International Journal of Epidemiology	4,6	4,7	4,8	4,8
Journal of Applied Psychology	5,7	6,0	5,2	4,8
International Review of Sport and Exercise Psychology	3,1	3,9	4,5	4,5
American Journal of Physiology - Endo & Metab	4,6	4,0	4,0	4,0
Frontiers in Physiology	2,8	3,3	3,8	3,9
Medicine and Science in Sports and Exercise	4,6	4,5	4,1	3,9
Exercise and Sport Sciences Reviews	4,6	3,5	3,8	3,6
Psychology of Sport and Exercise	2,3	2,5	3,0	3,6
Journal of Physiology	3,7	3,7	3,8	3,5
Journal of Science and Medicine in Sport	3,5	3,3	3,4	3,5
American Journal of Physiology - Heart & Circ	4,2	3,9	3,6	3,3
Behavior Research Methods				3,2
Scandinavian Journal of Medicine & Science in Sports	3,5	3,0	2,8	3,2
PLoS One	3,9	3,5	3,3	3,1
Acta Physiologica (Scandinavica)	3,7	3,5	2,8	3,0
Journal of Sport and Exercise Psychology	3,1	3,0	2,8	3,0
Sport Management Review	1,5	1,7	2,1	2,9

PER SAPERNE DI PIÙ



Conclusioni

- La tecnologia contribuisce notevolmente allo sviluppo delle scienze dello sport e della formazione
- Può essere variata e adattata alle esigenze
- La sua padronanza richiede lo sviluppo di competenze disciplinari e interdisciplinari.
- Deve essere utile e facile da usare
- Deve contribuire a garantire l'integrità fisica dell'atleta
- Deve soddisfare le esigenze delle discipline sportive
-

Définitions :

Sciences du sport : Domaine interdisciplinaire

è composto da diverse discipline scientifiche che analizzano la:
Complessità delle prestazioni sportive (concorsi e formazione).

l'atleta nelle sue diverse caratteristiche.

il collettivo nelle sue diverse caratteristiche.

i mezzi di allenamento, l'ambiente e la

Contesti specifici.

Le principali componenti:

Biologia e sue parti applicate

Fisiologia

Biomeccanica

Biochimica

Epidemiologia, Kinantropometrie, ecc.

Psicologia, sociologia, pedagogia, ecc..

Scienza dello sport e interdisciplinarietà

- L'interdisciplinarietà allarga esponenzialmente i confini della conoscenza tradizionale. Una sorta di avanguardia della ricerca scientifica, accademica, istituzionale e industriale
- Condurre ricerche analoghe richiede ancora più rigore e collaborazione con altri settori interessati.
- È facile creare confusione soprattutto tra gli studenti e gli allenatori nelle prime fasi di formazione e di attività.
-