

Documento de lectura

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Detraining effect in footballers

With the FIFA World Cup 2014 around the corner, the national players are still in training and competition mode and all players will compete in at least three games (however, everyone is hoping for seven).

However, this post is not about these players, its about the other players that are not present in the World Cup, enjoy their vacation and most likely do not train (at all, or at least have reduced their training). The question here arise how the players react to a reduced training load or no training load at all? Of course I do not necessarily meant to talk about the injured players.

In the scientific literature, the partial or complete loss of training-induced adaptation, in response to an insufficient training stimulus (17 - *see references below*) is called detraining (and here it seems obvious that injuries can also be seen as a kind of detraining as well). Detraining is a common phenomenon in sports (basketball (3) and the term “use it or loose it” seems to be proven right.

Before I would like to go into detail about the different detraining possibilities, I would like to highlight the general “football performance detraining”. Obviously performance in football is a construct consisting of different components, which is the reason why simple and easy to measure (football) performances such as a single sprint are mentioned in this section, even though it is not a “real” football performance. Furthermore, and due to the fact that there is not a lot of knowledge in a football background, I looked for other team sports (such as field hockey, then basketball, handball and other football codes), then for individual sports involving running and finally some clinical studies.

Sprint and agility

3 weeks of detraining showed significant decrease in 50-meter spring time in professional Serbian footballers (19). 8 weeks of between season rest was enough to significantly lower 15-meters sprint performance and Illinois agility test in semiprofessional English footballers (4).

Jump

Countermovement jump height was reduced after 2 weeks in physical educational students (11) and more importantly after 8 weeks of detraining in semiprofessional English footballers (4).

Strength

Experienced resistance trained adults (high-level football code athletes, mostly rugby and American football) showed an average decrease of 14.5% (± 14.3) in strength after a detraining period of 7.2 weeks (± 5.8). The authors suggested that the adults were able to maintain the majority of their pre-season strength levels with no resistance training over a detraining period of 2-3 weeks (15). Other

researchers suggested that elite athletes may be able to maintain maximum strength gains for up to 4 weeks (6, 10, 18).

However, highly trained athletes' eccentric force and sport-specific power, and recently acquired isokinetic strength, may decline significantly (18).

Youth athletes seemed to "lose" strength gains slower. 8 weeks of non-training resulted in a significant loss of upper (-19%) and lower body (28%) strength in children(8). Furthermore, 8 weeks again was enough to lose resistance strength gains even though a maintenance program was performed 1/week in 9-11 year old boys (14).

Flexibility

The sit-and-reach test was utilized to investigate the lower back and hamstring muscle group for flexibility. Detraining after 8 weeks negatively affected flexibility in semiprofessional football players (4).

Anthropometry

Body fat was significantly increased after 3 (19), 4 (12) and 8 weeks (4) of detraining in semi- (4) and professional (12) footballers. Generally, the highest %body fat was reported for pre-season values (coming from off-season) (16).

Additionally, a significant decrease in adductor muscle were also observed after 4 weeks (12).

Other

Upper and lower body strength/power gains (after 12 weeks) were reduced after 12 weeks of detraining in pre- and early pubertal boys (13).

Hip rotation range of motion decreased as an effect of football training and a stretching was shown to partially benefit the hip range of motion of Brazilian youth footballers (7).

Additional thoughts

Interestingly, reduced training and detraining (4-16 weeks) of upper- and lower-body explosive strength in adolescent basketball players was not enough to lose strength gains after a 10-week in-season complex training. It seems that the regular basketball training was able to preserve the players upper- and lower-body strength (21). As a consequence, it could be plausible that football might have the same effect.

Physiological detraining

Maximal oxygen consumption was reduced significantly after 8 weeks of detraining in semiprofessional footballers (4).

Interestingly, 3 weeks of detraining followed by 4 weeks of training was sufficient to keep the level of VO₂max of Danish National football players (2).

Significant changes in the anaerobic threshold for different parts of the season (pre – mid – end) were observed in professional soccer players (5). Pre-season values were the lowest, followed by end-of-season and mid-season revealing the highest data over all three years. However, no differences in VO₂max were observed suggests the preference of the anaerobic threshold over VO₂max in monitoring.

Increases in phosphorfructokinase after training for 3 month were abolished in the 6 month detraining in adolescent boys (9). However, 7 weeks to 6 month is needed in adults to return to baseline enzyme activity (20) in adults.

Physical detraining

The summer break (4-8 weeks) was invested in youth amateur Spanish footballers. Muscle biopsies were taken and the results showed an decreasing effect on cross-sectional area of type 1 and 2 muscle muscle fibers and important enzymes for aerobic and anaerobic endurance (1).

Furthermore, it seems that detraining appears to shift the contractile characteristics towards type IIb , although muscle atrophy is also likely to occur (20) in adults.

Conclusion

Due to the low amount of literature, it is impossible to draw definite conclusions. It seems that (and from my experience) 2 weeks of absence from training will not affect the player's performance (at all). Indeed it seems necessary (especially at the end of the season) to have a rest period, not only for psychological reasons. A detraining period of up to 4 weeks might not affect the players too much, however, peak performance (in all its facets) might be impossible to reproduce up to pre-detraining standards. Longer periods (probably >4 weeks) of absence of appropriate stimuli will significantly decrease players performance.

Detraining in youth might be dependent on their training status and their specific trainability to a given stimulus.

Unfortunately, it seems that there is a lack of literature on technical and tactical detraining (and possibly even psychological detraining – if that exists).

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