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ORIGINAL INVESTIGATION

Tapering and Repeated High-Intensity Effort Ability in Young Elite Rugby Union Players: Influence of Pretaper Fatigue Level

Adrien Vachon, Nicolas Berryman, Iñigo Mujika, Jean-Baptiste Paquet, and Laurent Bosquet

Purpose: To assess the effects of a short-term taper on the ability to perform repeated high-intensity efforts, depending on players' fatigue level following an intensive training block. ***Method:*** After a 3-day off-season camp, 13 players followed the same 3-week preseason training block followed by a 7-day exponential taper. Performance was assessed by a repeated high-intensity effort test before and after the taper. Total sprint time, percentage of decrement, and the number of sprints equal to or higher than 90% of the best sprint were retained for analysis. Players were a posteriori classified in normal training or acute fatigue groups based on their readiness to perform prior to the taper, assessed through the magnitude of difference in psychological (Profile of Mood State Questionnaire), cardiovascular (submaximal constant-duration cycling), and neuromuscular (countermovement jump) tests between the preintensive and postintensive training blocks. ***Results:*** Training load declined by 55% (9%) during the taper ($P = .001$, $g = -2.54$). The overall group showed a small improvement in total sprint time (−3.40% [3.90%], $P = .04$, $g = -0.39$) following the taper. Relative changes tended to be higher in the acute fatigue compared with the normal training group (−5.07% [4.52%] vs −1.45% [1.88%], respectively; $P = .08$; $d = 1.01$). No taper-induced improvement was observed in percentage of decrement or number of sprints equal to or higher than 90% of the best sprint. ***Conclusion:*** A 7-day taper consisting of 55% training load reduction improved repeated high-intensity effort performance in young elite rugby union players. Pretaper level of fatigue seems to be a key determinant in the taper supercompensation process, as acutely fatigued players at the end of the intensive training block tended to benefit more from the taper.

Keywords: supercompensation, repeated efforts, team sport

A taper is a period of training load reduction intended to decrease fatigue and optimize physiological adaptations before a competition.[1] The benefits of a taper have been widely discussed in endurance sports,[2] but emerging literature confirmed its usefulness in team sports[3] as a way to improve players' physical determinants of performance. Taper could be implemented at the end of the preseason to better prepare for the first official match,[4,5] within the season for targeting important matches, or peaking for a tournament.[6] Due to the performance demands of elite sport, practitioners tend to implement proven successful tapering strategies, consisting of maintenance of training intensity and frequency, whereas training volume is often reduced from 40% to 60%, depending on the duration of the taper.[3]

Studies in Rugby Sevens revealed moderate to large improvements in acceleration, sprint, repeated-sprint ability (RSA), and aerobic performance following either a 14-day[7] or a 21-day taper[8] with 20% to 39% and 40% to 59% training volume reduction, respectively. Similar results were reported in rugby league players,[4] with small to moderate improvements in jump performance following a 21-day taper with a 40% to 59% reduction in training volume. In contrast, a 7-day taper with a 55% volume reduction did not allow sufficient recovery to optimize supercompensation despite improvements in key fitness variables,[5] which suggests that a longer taper would result in greater benefits.

Repeated-sprint ability appears to be an important quality for rugby players, and a recent meta-analysis suggested that small improvements in RSA could be observed after an appropriate taper in team sports.[3] However, recent studies highlighted that repeated high-intensity effort (RHIE) ability could be more discriminant than RSA, as the addition of multiple contacts (ie, tackle, ruck, or maul/scrum) may be more representative of the physical demands of rugby.[9] In this context, it seems pertinent to explore the effects of a taper on rugby players' RHIE ability.

Among many taper-related variables that could be manipulated, few studies have considered the athletes' state of fatigue prior to the taper, although it has been identified as a crucial determinant of the supercompensation process.[10] Aubry et al[11] implemented intensified training in triathletes, and a subsequent taper led to greater improvements in a maximal incremental test in acutely fatigued athletes compared with functionally overreached or normally trained athletes. Following the taper, Bellinger et al[12] also reported better improvement in time to exhaustion in acutely fatigued runners compared with those functionally overreached.

The aim of this study was to assess the effect of a taper on the RHIE ability of young elite rugby union players and to test the hypothesis that the taper response would depend on the athletes' fatigue state at the end of the training block. It was hypothesized that the taper implemented would be more beneficial for players showing acute fatigue (AF), but players normally trained would show less or no supercompensation.

Vachon, Berryman, and Bosquet are with the Lab MOVE (EA6314), Faculty of Sport Sciences, University of Poitiers, Poitiers, France. Vachon and Paquet are with the Stade Rochelais Rugby, La Rochelle, France. Berryman is with the Dépt des Sciences de l'Activité Physique, Université du Québec à Montréal, Montréal, QC, Canada; the Inst National du Sport du Québec, Montréal, QC, Canada; and the Dept of Sports Studies, Bishop's University, Sherbrooke, QC, Canada. Mujika is with the Dept of Physiology, Faculty of Medicine and Nursing, University of the Basque Country, Leioa, Basque Country Spain; and the Exercise Science Laboratory, School of Kinesiology, Faculty of Medicine, Universidad Finis Terrae, Santiago, Chile. Bosquet is also with the Dept of Kinesiology, University of Montréal, Montréal, QC, Canada. Bosquet (laurent.bosquet@univ-poitiers.fr) is corresponding author.

Methods

Participants

Sixteen young (U21) elite rugby union players from the same Top 14 (first division of French professional rugby union) club participated in this study. Participants were members of the U21 team, playing at the top national level and regularly joining the professional team. Two participants withdrew from the study due to sickness (unavailability > 3 d), and a third participant was excluded because of a severe injury. The final sample size was 13 players (age = 18 [1] y; height = 181.9 [9.2] cm; body mass = 90.3 [12.3] kg). All procedures were part of the teams' service provision, which conforms to the code of ethics of the World Medical Association (Declaration of Helsinki). Athletes provided informed consent to participate in monitoring procedures associated with team duties with the understanding that data may be used for research purposes.

Experimental Design

Following a 3-day off-season cohesion camp, all players followed the same 3-week preseason intensive training block followed by a 7-day exponential taper (Figure 1). The 3-week intensive training block was characterized by a high training load and a stable relative distribution (in percentage) of training contents (ie, neuromuscular, cardiovascular, technical/tactical training). During this period, players underwent 16 (2) training sessions per week over 5 training days with a weekly perceived effort of 4.6 (1.0) on the CR-10 scale.[13] Using an integrated method of physical development, the relative distribution of training content was set at 35/15/50 for neuromuscular, cardiovascular, and technical/tactical training, respectively (Table 1). The 7-day taper consisted of a 60% exponential decrease of training volume. Training intensity, frequency, and the relative distribution of training content were expected to be similar to the previous 3-week training block.

To assess training readiness, athletes completed a psychometric questionnaire (Profile of Mood States [POMS]), a submaximal constant duration cycling test to measure heart rate (HR), and a neuromuscular test (countermovement jump [CMJ]). The questionnaire and the constant duration test were completed at baseline (t0) and after the 3-week intensive training block (t1), whereas the neuromuscular test was performed thrice weekly during the 3 weeks of the training block. A RHIE test was performed at t1 and after the 7-day taper (t2).

Tests and Measures

Training Load. Training load was assessed using the session rating of perceived exertion (sRPE).[14] Approximately 30 minutes after each training session, participants were asked to record the perceived effort on the CR-10 scale. Daily training load was obtained by multiplying the average perceived effort of the day by the duration of training (in minutes). Weekly training load was obtained from the sum of the daily training loads. All participants had at least 6 months of experience with the CR-10.

Volume and intensity of the rugby sessions were monitored using GPS units (Gpexe pro^2, Exelio Srl, Udine, Italy) placed in a small pocket on the upper back of a wearable shirt between the 2 scapulae. Total distance (in meters) and distance covered at velocities >20 km·h^{-1} were retained for further assessments.[15] The distance covered at velocities >20 km·h^{-1} was also expressed as a percentage of total distance (%HI). During neuromuscular

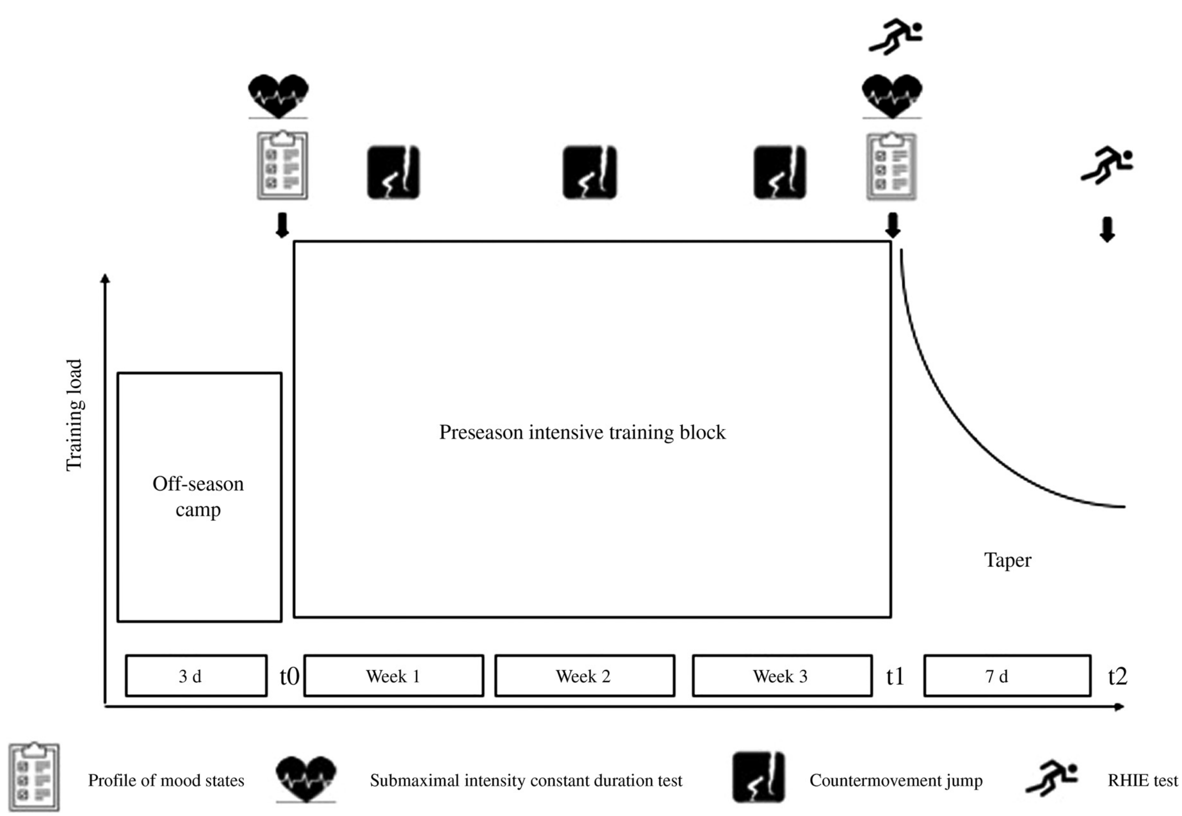

Figure 1 — Schematic representation of the study design. RHIE indicates repeated high-intensity effort.

Table 1 Frequency, Volume, and Intensity Parameters of Training Block and Taper Period

Training parameter	Training block			Taper
Duration, wk	1	1	1	1
Training load, a.u.	4258 (798)	3796 (910)	4431 (1160)	1852 (207)**
Perceived effort, CR-10	4.8 (0.9)	4.2 (0.6)	4.8 (0.9)	5.0 (1.7)
Training distribution, % (N/C/T)	39.9/17.2/42.9	32.5/13.7/53.8	33.1/16.2/50.7	27.1/14.5/58.4*
Technical and tactical training				
Number of sessions, n	6	6	6	5**
Duration, min	350	315	375	225**
Total distance, m	19,354 (2986)	18,690 (2287)	20,745 (5063)	14,118 (235)*
Distance > 20 $km \cdot h^{-1}$, m	545 (419)	358 (298)	588 (588)	337 (102)*
Distance > 20 $km \cdot h^{-1}$, %	2.6 (2.3)	1.7 (1.5)	2.4 (2.2)	2.0 (1.1)
Neuromuscular training				
Number of sessions, n	6	5	7	3**
Duration, min	325	190	245	85**
Number of reps, n	543	604	609	481**
Cardiovascular training				
Number of sessions, n	5	3	5	3**
Duration, min	140	80	120	75**

Abbreviations: a.u., arbitrary units; C, cardiovascular training; N, neuromuscular training; reps, repetition; T, technical and tactical training.
*Different from training block average ($P < .05$). **Different from training block average ($P < .01$).

training sessions, volume was monitored through the number of repetitions performed.

POMS Questionnaire. The POMS[16] is a 65-item questionnaire that provides measures of 6 specific mood states: vigor, depression, fatigue, anger, anxiety, and confusion. The mood state index was obtained by adding the 5 negative factors together and subtracting the positive factor of vigor. The energy index (EI) represents the difference between the scores of vigor and fatigue.[17] Considering their sensibility to overload- and taper-induced changes in performance,[18] vigor, fatigue, and EI were retained for subsequent analyses.

Submaximal Constant Duration Cycling Test. This test consisted of a 5-minute submaximal intensity exercise on a cycle ergometer (Group Cycle Connect; Technogym, Cesena, Italy) immediately followed by 5 minutes of passive rest (5'–5' Heart Rate Recovery test) during which players were asked to remain seated, and HR was continuously monitored (Firstbeat SPORT, Jyväskylä, Finland), beat by beat, during exercise and recovery. Initially proposed by Buchheit et al[19] as a running test, it was adapted as a cycle ergometer test to facilitate its implementation within the athletes' training environment. Players were familiar with the cycle ergometer as cycling sessions were part of the typical warm-up during strength sessions. Exercise intensity was set at 200 W for all players. The HR series were edited and visually inspected so that ectopic beats could be replaced by interpolated data from adjacent normal to normal intervals. The time constant τ, which represents the time needed to reach 63% of the gain, and HR at the end of exercise were used for analysis. Submaximal HR was determined as the sum of a0 (ie, asymptotic value of HR) and a1 (ie, decrement below the HR value at the end of exercise for $t = \infty$).[20]

Countermovement Jump Test. A countermovement jump was performed using a commercially available system (Optojump, Microgate Corporation, Bolzano-Bozen, Italy). All jumps were initiated from a standing still position followed by a 90° knee flexion immediately followed by the jump phase. Players were asked to keep their hands on their waist during the entire jump. Each player performed 3 maximal CMJ interspersed by 1 minute of rest, and the average height of the 3 jumps was retained for analyses.[21]

RHIE Test. The procedure of the RHIE test has been reported previously.[22] Briefly, immediately after a standardized dynamic warm-up, the participants performed the RHIE test, consisting of 12 repetitions of a 20-m sprint immediately followed by a tackle. A 30-m active recovery was given between repetitions with each sprint starting every 30 seconds (Figure 1). Total sprint time (TST) was considered as the final test result with a meaningful change threshold of 3.59% and percentage of decrement (%D) an indication of an athlete's ability to delay fatigue. The number of sprints equal to or higher than 90% of the best sprint (N90) was also recorded. A reliability[22] study reported that the test was considered valid, and the results were analyzed if the coefficient of variation of an athlete's tackle performance was less than 45.9% and 34.2% for total g-force and average g-force, respectively. This verification ensured that a player produced a steady effort on the tackle task.[22]

Data Analysis

Fatigue Cluster. To describe the magnitude of changes in psychological, cardiovascular, and neuromuscular variables between t0 and t1, measures were expressed as a factor of the smallest worthwhile change (SWC). The SWC was calculated using 0.2 of the between-athletes SD for CMJ performance[23]; 1% and 7% of the initial athlete value for submaximal HR and τ[24]; and half the typical error of measurement for POMS variables.[23] Values of 1×SWC, 3×SWC, 6×SWC, and 10×SWC were used as thresholds for small, moderate, large, and very large differences, respectively.[25]

Based on the magnitude of difference between t0 and t1, 3 researchers blinded to players' characteristics independently assessed the fatigue level of participants as normal training

Table 2 Selection Criteria of NT and AF Group

Number of scenarios	Psychological test	Neuromuscular and cardiovascular test	Group
1	1 large or very large negative change OR 1 moderate negative change + 1 small negative change	No negative changes needed	AF
2	Multiple small negative changes OR EI warning test value	Multiple small negative changes	AF
3	No negative change	1 large or very large negative change OR 1 moderate negative change + multiple small negative changes	AF
4	Multiple trivial or positive changes		NT

Abbreviations: AF, acute fatigue; EI, energy index; NT, normal training. Note: EI warning test, EI ≤ 0.

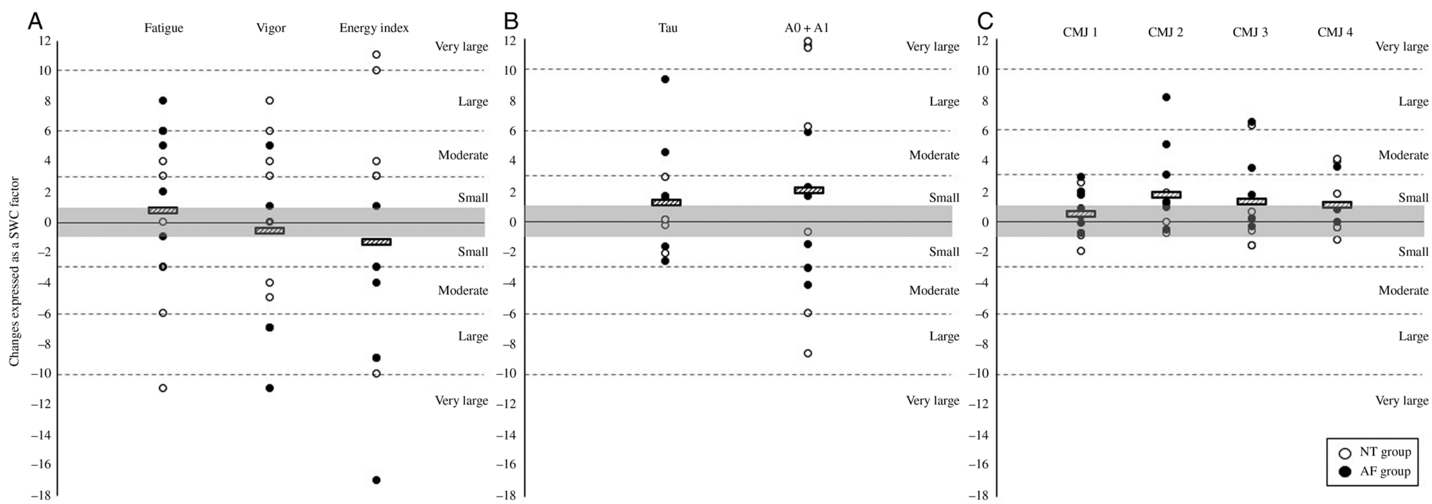

Figure 2 — Individual changes to (A) psychological, (B) cardiovascular, and (C) neuromuscular tests following training block period. AF indicates acute fatigue; CMJ, countermovement jump; NT, normal training; SWC, smallest worthwhile change.

(NT) or AF. Selection criteria for these 2 categories are presented in Table 2. Changes in vigor, fatigue, and EI were used to assess changes in mood states. Furthermore, an EI ≤ 0 was considered as a warning test value.[17] Agreement between all researchers was required to confirm the fatigue state of a player. The final categorization was validated by the senior strength and conditioning coach's knowledge of the players during the preseason period. Any disagreement was discussed and resolved in a consensus meeting.

Statistical Analysis. Data are presented as mean (SD). Changes in psychological, cardiovascular, and neuromuscular measures between t0 and t1 are expressed as a factor of the SWC. All data were log transformed to reduce bias arising from nonuniformity error. Data normality was evaluated by the Shapiro–Wilk test. Student *t* tests for dependent samples or Wilcoxon tests when normality of distribution was not satisfied were used to test the null hypothesis that measures were similar between t0 and t1. A 2-way factorial analysis of variance (group × time) with repeated measures on the time factor was performed to test the null hypothesis that measures were similar between groups and at each time point. Multiple comparisons were made with Tukey honest significant difference post hoc test. Student *t* test for independent samples was performed to test the null hypothesis that the difference between t1 and t2 (ie, Δ t1/t2) was similar between groups. The magnitude of the difference between independent samples was assessed by Cohen *d* and by Hedge *g* for dependent samples. Cohen scale was used for interpretation of both measures where changes were considered small (0.20 ≤ ES < 0.50), moderate (0.50 ≤ ES < 0.80), or large (ES ≥ 0.80).[26] Statistical tests were conducted using Statistica (version 10; StatSoft, Tulsa, OK).

Results

Assessment of Fatigue Level

Individual psychological, cardiovascular, and neuromuscular adaptations to intensive training (t0–t1) are presented in Figure 2. Three players (no.: 10, 12, and 13) met the criteria for scenario 1 (Table 2), whereas 6 players (no.: 4, 6, 8, 9, 12, and 13) were associated to scenario 2. All of these players were, therefore, allocated to the AF group. In contrast, 6 players (no.: 1, 2, 3, 5, 7, and 11) met the scenario 4 criteria and were allocated to the NT group (Table 3). This led to the inclusion of 7 players in the AF group and 6 players in the NT group.

Table 3 Illustration of Players' Pretraining to Posttraining Block Changes and Group Decision-Making Process

	Psychological test				Cardiovascular test		Neuromuscular test				Decision making	
			Energy index									
Player	Fatigue	Vigor	Changes	Raw	τ	a0 + a1	Day 1	Day 2	Day 4	Day 6	Scenario	Group
1	↓↓↓↓	↓↓↓	↑↑	13	—	↓↓↓	↓	—	↓	↑	Scenario 4	NT
2	—	↑↑	↑↑	17	↑	↑↑↑↑	—	—	—	↓	Scenario 4	NT
3	↓↓	↑↑↑	↑↑↑↑	9	↓↓↓	↑↑↑↑	—	↑	—	—	Scenario 4	NT
4	↑↑	↓↓	↓↓	0	—	↑	—	—	—	—	Scenario 2	AF
5	↑↑	↓	↓↓	14	↑	↑	—	—	↑	—	Scenario 4	NT
6	↑↑	↑	↓↓	0	↑↑↑	↑↑	↑	↑↑	↑↑	—	Scenario 2	AF
7	↓↓↓	↑↑	↑↑↑↑	24	↑	↑	—	—	—	↑↑	Scenario 4	NT
8	—	—	—	0	↑	↑	—	—	—	↓↓↓↓	Scenario 2	AF
9	↓↓	—	↑↑	2	↓	↑	↑	↑	—	—	Scenario 2	AF
10	↑↑↑	↓↓↓↓	↓↓↓↓	7	↓	↑↑	—	↑	—	—	Scenario 1	AF
11	↑↑	↑↑↑	↑↑	7	—	↑↑↑	↑	↑	↑↑↑	↑↑	Scenario 4	NT
12	↑↑↑	↑↑	↓↓	–9	↑	↓	—	↑↑↑	↑↑↑	↑↑	Scenarios 1 and 2	AF
13	↑	↓↓↓	↓↓↓	0	↓	↓	↑	—	↑	—	Scenarios 1 and 2	AF

Abbreviations: AF, acute fatigue; NT, normal training. Note: —, trivial; ↑, small increase; ↑↑, moderate increase; ↑↑↑, large increase; ↑↑↑↑, very large increase; ↓, small decrease; ↓↓, moderate decrease; ↓↓↓, large decrease; ↓↓↓↓, very large decrease.

Taper Strategy

Training block and taper characteristics are presented in Table 1. During the taper, all indices of training volume were reduced, including a 31% decrease in training frequency ($P = .01$). Indices of training intensity remained unchanged between both periods (4.6 [0.7] vs 5.0 [1.7] and 2.2 [1.9] vs 2.0 [1.1] for CR-10 and %HI, $P = .34$ and .76, respectively). In contrast, relative training distribution was modified ($P = .01$) toward more technical and tactical training at the expense of neuromuscular training. Altogether, these modifications led to a large training load reduction during the taper compared with the 3-week training block average (–55% [9%], $P = .01$, $g = -2.54$).

Taper Effect on RHIE Ability

Taper effects on RHIE ability are summarized in Table 4, and individual responses are presented in Figure 3. The overall group (n = 13) showed a small improvement in TST (–3.40% [3.90%], $P = .04$, $g = -0.39$). There was no difference between groups at t1. A tendency was observed toward a small improvement in NT ($P = .97$; $g = -0.37$) and AF ($P = .57$; $g = -0.45$) between t1 and t2 in TST. Relative changes tended to be higher in AF in comparison with NT, as the average change reached the 3.59% minimum difference for athletes in AF (–5.07% [4.52%] vs –1.45% [1.88%], respectively; $P = .08$; $d = 1.01$). Regarding %D and N90, no taper-induced improvement in the overall group or any interaction between groups were observed. All players met the validation criterion of tackle indices.

Table 4 Taper Effect on RHIE Ability of Elite Rugby Union Players

				t1/t2	
Performance parameter	Group	t1	t2	Changes	ES (Hedge *g*)
TST, s	Overall	43.64 (3.87)	42.09 (3.36)*	–3.40 (%3.90)	*–0.39 small*
	NT	41.70 (1.06)	41.10 (1.41)	–1.45 (%1.88)	*–0.37 small*
	AF	45.30 (4.69)	42.95 (4.37)	–5.07 (%4.52)	*–0.45 small*
%D, %	Overall	9.37 (4.28)	9.18 (3.36)	–0.19 (%2.67)	*–0.04 trivial*
	NT	9.22 (2.19)	8.86 (2.58)	–0.36 (%1.30)	*–0.12 trivial*
	AF	9.49 (5.70)	9.45 (4.11)	–0.04 (%3.58)	*–0.01 trivial*
N90, n	Overall	8.2 (3.3)	8.7 (3.0)	6.60 (%25.3)	*0.16 trivial*
	NT	8.0 (2.8)	8.3 (3.4)	4.17 (%17.1)	*0.08 trivial*
	AF	8.3 (3.9)	9.0 (2.7)	8.62 (%31.7)	*0.17 trivial*

Abbreviations: %D, percentage of decrement; AF, acute fatigue; ES, effect size; N90, number of sprint equal to or higher than 90% of the best sprint; NT, normal training; RHIE, repeated high-intensity effort; TST, total sprint time. Italic values denote effect size values.
*Different from t1 ($P < .05$).

Discussion

This study aimed to assess the effects of a taper on RHIE ability in young elite rugby union players. We hypothesized that the taper would be more beneficial for players showing AF, whereas players normally trained would show less or no supercompensation. Our main results were that (1) the taper strategy improved RHIE performance, and (2) the initial level of fatigue seemed to be a key factor in the magnitude of the performance response to the taper.

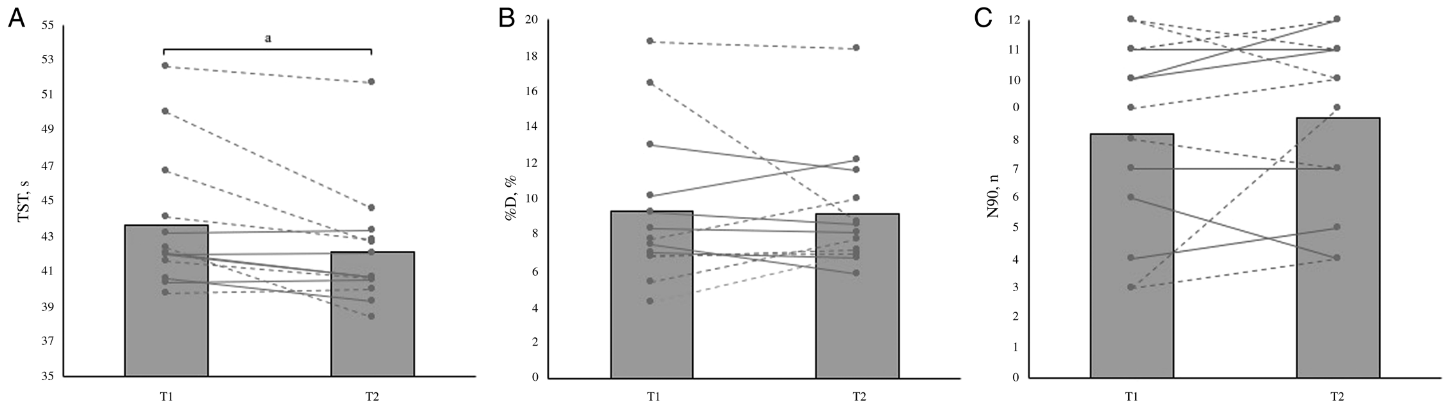

Figure 3 — Individual response to taper on (A) TST, (B) %D, and (C) N90. %D indicates percentage of decrement; N90, number of sprints equal to or higher than 90% of the best sprint; TST, total sprint time. [a]Different with $P < .05$.

Taper Strategy

This study was designed to fit within the typical training schedule implemented prior to the beginning of a competitive rugby union season. The competition calendar did not allow us to dedicate more time to the taper. Considering the short duration of the taper and the accumulated fatigue during the intensive training block, we opted for maintaining training intensity during the taper and reducing training volume by 60% to increase the probability of a rebound in performance capacity.[2,27] As expected, a posteriori analyses revealed that perceived effort remained unchanged during the taper, although overall training volume was reduced by 55% (Table 1). A reduction in training volume can be obtained by decreasing training frequency, the duration of each training session, or a combined reduction of both. In our study, the overall decrease in volume was obtained by a combination of both strategies, as training frequency was decreased by 31% (ie, from 16 to 11 sessions per week). This strategy was selected because it suited best the context of this elite rugby union team. Indeed, during the intensive training block, a strong emphasis was put on the improvement of physical fitness in multiple daily training sessions. In contrast, the focus shifted to tactical contents during the taper leading into the championship. The consequence, in terms of relative training content distribution, was a decrease in training frequency at the expense of neuromuscular training.

Taper Effect on RHIE Ability

Considering the overall sample, the taper strategy induced a significant improvement in TST, whereas no changes were observed in %D and N90 performance (Table 4). The magnitude of the improvement on TST was close to the 3.59% minimal detectable difference previously reported for this test[22] and in agreement with a recent meta-analysis,[3] suggesting that a taper could lead to small positive effects in repeated efforts (ie, sprints and sprints + tackle).

Regarding the relationship between the magnitude of performance gains in TST and players' pretaper level of fatigue, the taper seemed more beneficial to AF than to NT players (−5.07% [4.52%] vs −1.45% [1.88%], respectively). Differences, however, were not statistically significant, likely due to weak statistical power. The high variability in performance gains highlights important interindividual differences. Indeed, 6 of 7 AF players improved TST, with 3 out of 6 exceeding the 3.59% MD. As for the 4 AF players who did not reach the MD, 3 of them displayed moderate to large decreases in EI after intensive training, reaching a null score, whereas a very large decrease was observed for the remaining player. It could be speculated that these 4 players reached a more severe state of fatigue (ie, functional overreaching) after intensive training and that the magnitude of training load decrease during the taper was not sufficient to allow a supercompensation. These results suggest an inverted U relationship between players' initial state of fatigue and the magnitude of the response to the taper.

This is in agreement with the results of Aubry et al,[11] who showed in elite endurance athletes that taper-induced performance gains were larger when the initial level of fatigue was moderate. These authors showed that the level of fatigue had to stay within reasonable limits, as overreached athletes just benefited from a return to baseline after the taper, whereas not overreached athletes markedly improved their performance capacity. Bellinger et al[12] also observed that the response of highly trained runners to a taper subsequent to a 6-week training block depended on their state of fatigue (ie, AF vs functionally overreached). They reported an increase in muscle oxidative capacity and a substantially larger performance improvement in acutely fatigued athletes.

Regarding other performance parameters calculated during the RHIE test, no improvement in %D or N90 was observed, suggesting that anaerobic performance (ie, TST) was most affected by a short-term taper. Indeed, %D is more related to players' aerobic fitness,[28] and it seems that the taper implemented in this study did not allow a supercompensation of aerobic qualities. The apparent specificity of the taper response to the type of activity seems to be in keeping with Coutts et al[5] who reported that the physiological adaptations are dependent on the type of training performed during the taper. Taken together, these results highlighted the need to monitor athletes' level of fatigue during an intensive training block to optimize the effects of a subsequent taper.

Limits

For a proper interpretation of this study, some limitations should be acknowledged. First, elite players' schedule constraints limited participant availability and led to a sample size of only 13 athletes, further divided in 2 groups of 6 and 7 athletes. This limitation did not allow us to reach a sufficient statistical power, and care was taken to interpret the results cautiously. To overcome the weak statistical power, results were interpreted using percentage difference scores and an index of effect size (ie, Hedge *g*), which account for small samples.

Another limitation of this work could be the lack of performance testing at the start of the intensive training block (t0). Previous studies assessing the effects of a taper commonly reported values at t0 to assess the supercompensation effect.[8] However, due to the high physical demands of the RHIE test (ie, repetition of maximal sprints and tackles, implying a high risk of injury), it was decided to avoid such a test at the beginning of the training camp (t0).

Practical Application

Tapering strategies could be effectively implemented by coaches to improve players' RHIE ability at the end of an intensive training block in elite rugby union players. Practitioners are advised to use a multifactorial assessment of players' state of fatigue before the taper, as it affects the magnitude of the supercompensation. Indeed, an inverted U relationship seems to exist between the players' initial state of fatigue and the magnitude of the response to the taper: a 7-day taper would not elicit optimal supercompensation in the presence of too little or too much fatigue. Given the difficulties of implementing an optimal taper of 2-week duration[8] due to the constraints imposed by professional rugby union schedules, and considering that larger training load reductions (ie, >60%) may fail to accelerate the recovery process[27] while maintaining suitable amounts of technical–tactical training prior to the first official matches,[3] future studies should assess whether different strategies to enhance recovery during short-term tapers would allow optimal supercompensation.

Conclusion

This study analyzed the influence of a 7-day taper consisting of 55% training load reduction on rugby union players' RHIE ability, depending on their initial level of fatigue. Results revealed that tapering is an effective strategy to improve RHIE performance. Pretaper level of fatigue seems to be a key determinant of the magnitude of the response to the taper, as acutely fatigued players at the end of the intensive training block may have benefitted more from the taper strategy than normally trained players. In the context of often congested professional competition calendars where only short periods are available to taper, future studies should focus on the concomitant implementation of recovery strategies during the taper to induce additional supercompensation effects.

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