

**Periodization Across the Competitive Season: A Structured but Adaptable Approach to
Strength and Conditioning**

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Abstract

Periodization provides a way to organize training across a competitive season, but how that training is organized may need to change based on the athlete and the demands of the season. Although several periodization models have been developed, current evidence does not show that one model is best for every athlete or situation. This review examines research on periodization models, autoregulation, training volume, and selected training methods to evaluate what the evidence supports, where limitations exist, and how those findings can inform programming decisions. Research indicates that different periodization models can improve physical performance, but findings do not consistently establish one approach as superior. Autoregulation may help guide training adjustments, while lower training volumes may be appropriate during the competitive season, although the certainty of some evidence remains limited. Assessments can help identify what an athlete needs to improve, while readiness, recovery, training response, and competitive demands can help determine how training should progress. During the off-season, there may be more opportunity to develop strength and other physical qualities. During the competitive season, the emphasis generally shifts toward maintaining those qualities while managing training demands and recovery. Periodization provides the structure, but the plan may need to change when there is a reason to adjust. Research should guide programming decisions, while professional judgment helps determine how the evidence applies to the individual athlete.

Keywords: periodization, autoregulation, resistance training, athlete readiness, strength and conditioning

Periodization Across the Competitive Season: A Structured but Adaptable Approach to Strength and Conditioning

The earlier EXSC 8040 paper on periodization across the competitive season focused on a hybrid approach that combined different periodization models and training methods to improve and maintain athletic performance. However, a closer look at the research raises questions about whether one approach consistently outperforms another. Although periodization provides structure for organizing training, the research shows that different approaches can produce similar results. Interpreting these findings requires consideration of who was studied, how the training was organized, and what outcomes were measured.

Research comparing periodization models has produced mixed findings, making it difficult to determine whether one approach is consistently better than another. In a systematic review and meta-analysis of 29 studies, Zhang et al. (2026) found similar results between linear and undulating periodization for strength and overall athletic performance. Although both approaches were effective, the findings must be interpreted in relation to the populations studied, training programs used, and outcomes measured. This is important because findings from one group of athletes or training situation may not apply to another.

The competitive calendar also shapes how training is organized. Athletes may have different amounts of time available during the off-season depending on when their competitive season ends. For example, an athlete whose team advances further into the playoffs will have less time to prepare for preseason than one whose season ends earlier. Although these differences influence how training is structured, they do not necessarily support following one predetermined sequence of training phases. Therefore, available time, assessment findings, and individual training needs should be considered when organizing the program.

The earlier EXSC 8040 paper also discussed autoregulation to adjust training based on an athlete's readiness and performance. Although that approach remains valuable, a closer examination of the research gives a better understanding of its effectiveness and limitations. Huang et al. (2025) found that autoregulated training methods can improve maximal strength, but results varied by method and exercise. These findings support using autoregulation without establishing one method as superior for every athlete or training situation.

Building on the earlier EXSC 8040 paper, this review examines research on periodization models, assessment, autoregulation, training volume, and selected training methods. Rather than identifying one optimal approach, the goal is to evaluate what the research supports, where the evidence is limited, and how those findings can guide programming decisions throughout the competitive season.

Limitations of a Single Periodization Model

Research shows that periodization can improve maximal strength, but the findings do not consistently support one model over another. In a systematic review and meta-analysis of 35 studies, Moesgaard et al. (2022) found greater improvements in one-repetition maximum strength with periodized training compared with non-periodized training, even when total training volume was the same. The researchers also found greater strength improvements with undulating compared with linear periodization, particularly in trained individuals. However, they did not find the same advantage for muscle hypertrophy, suggesting that the outcome measured matters when evaluating the effectiveness of different training approaches.

Other research has produced different findings. Gavanda et al. (2019) compared block and daily undulating periodization in adolescent football players over 12 weeks. Both groups improved muscle mass, maximal strength, countermovement jump performance, medicine-ball

performance, and sprint speed, with no significant differences between the programs. Similarly, Zhang et al. (2026) reviewed 29 studies comparing linear and undulating periodization and found no significant differences in upper- and lower-body strength or overall athletic performance. However, the studies included athletes with different training backgrounds, and evidence for specific outcomes, such as sprint speed, was limited.

Collectively, these studies support periodization as an effective way to organize training, but they do not establish one model as consistently superior. Differences in the models compared, populations studied, and outcomes measured limit how broadly the findings can be applied. The earlier EXSC 8040 paper focused on combining different periodization models to organize training throughout the competitive season. Although this remains a reasonable approach, the reviewed studies do not directly establish whether combining models yields better results than using a single model. Instead, the findings suggest basing the approach on the athlete, the training goals, and how well the research applies to their individual situation.

Structured Seasonal Planning

Periodization provides a way to organize changes in volume, intensity, and training methods over time. Research supports varying volume and intensity to develop maximal strength (Moesgaard et al., 2022), although it remains unclear whether these results are specific to periodization or reflect changing the training stimulus over time (Kiely, 2018). What the evidence does support is planned variation in training without establishing one progression that every athlete should follow.

Training can be organized into shorter phases based on the qualities being developed. Periodization uses sequential phases to organize changes in training variables over time (Williams et al., 2017). In the framework used for this review, a 12-week training cycle is

divided into four three-week phases: Accumulation 1, Intensification 1, Accumulation 2, and Intensification 2. Accumulation phases emphasize greater training volume at lower relative intensities, while intensification phases shift toward higher intensity and lower volume. The three-week phases provide structure for this framework but are not presented as a duration or sequence established by the research.

The competitive calendar determines how much time is available to apply that structure. An athlete with a longer off-season may have time to complete the full 12-week cycle, while an athlete whose team goes deeper into the playoffs may have a shorter off-season before preseason begins. The amount of time available helps determine how training can be organized, while assessment and the athlete's needs help determine which qualities should receive greater emphasis during that time.

Individual Assessment and Training Direction

Once the off-season is established, assessment can help determine what the athlete needs to improve and which physical qualities should receive greater attention. Assessments can examine physical qualities such as absolute and relative strength, speed, acceleration, agility, change of direction, and movement quality. The assessments selected should match the demands of the sport and the athlete's training goals. Considering the results together with the athlete's training history and on-field performance can help identify which qualities should receive greater emphasis in the program.

For example, comparing countermovement jump (CMJ) and squat jump (SJ) heights can provide information about an athlete's jumping performance and the effect of using a countermovement. Van Hooren and Zolotarjova (2017) examined differences between these tests and noted limitations in interpreting height differences alone. When considered alongside

strength and sprint results, jump assessments can provide additional information when deciding which physical qualities should receive greater emphasis in the program. The comparison informs programming rather than serving as a definitive measure of either quality.

The information collected through assessment can then help determine what should receive greater emphasis during training. If several assessments identify a physical quality that needs attention, exercise selection and training methods can target that area. Repeating the assessments throughout the training cycle can also help determine whether the athlete is improving. However, improving a test result does not necessarily mean the athlete's sport performance has improved. Assessment provides a starting point for programming and a way to evaluate whether the training is producing the intended changes.

Autoregulation and Readiness

Assessment helps establish the initial training direction, but an athlete's readiness can change from day to day. Sleep, recovery, nutrition, practice, competition, and activity outside of training can affect how an athlete responds to the planned workload. Autoregulation allows the coach to make adjustments based on how the athlete is responding without changing the overall training plan.

Autoregulation can use objective measures such as bar velocity or subjective measures such as rating of perceived exertion (RPE), repetitions in reserve (RIR), and athlete feedback. Huang et al. (2025) compared autoregulatory progressive resistance exercise (APRE), velocity-based training (VBT), and RPE-based approaches with traditional percentage-based training. Their systematic review and network meta-analysis found greater overall improvements in maximal strength with autoregulatory methods. However, results varied by exercise and method.

These findings suggest that autoregulation may be useful for adjusting training based on the athlete's response, but do not establish one method as better than another in every situation.

Although VBT can provide useful information, the equipment and cost may limit its use in some training environments (Weakley et al., 2021). RPE and RIR provide other ways to adjust training without additional equipment. Regardless of the method used, the athlete's feedback and performance during the session should help determine whether the planned workload needs to change.

For example, an athlete may report feeling tired but perform better once training begins, while another may feel ready coming into the gym, but struggle with the prescribed workload. In either case, the coach can adjust training volume or intensity based on how the athlete performs. Following the written program too dogmatically, without considering the athlete's readiness and performance, may result in training loads that do not match the athlete's current capabilities. Autoregulation allows the coach to adjust when there is a reason to do so, rather than changing the program without a plan.

Off-Season Development

To reiterate, the amount of time available during the off-season depends on when the athlete's season ends and when preseason begins. An athlete whose team is eliminated early may have considerably more time to train than one whose team advances deep into the playoffs. This determines how many accumulation and intensification phases can be completed and how long each phase can last.

One practical coaching recommendation is to give athletes time away from structured training immediately after their season, including time with family and friends. This is a programming preference rather than a specific recommendation from the reviewed research.

Scheduling this time at the beginning of the off-season may also reduce later training interruptions. Once the athlete returns, the remaining time can be organized into a more consistent training block leading into preseason.

With the available training time established, assessment results, training history, and sport demands help determine which physical qualities to prioritize. Training can be organized through accumulation and intensification phases. However, the number, duration, and objectives of those phases will vary depending on the athlete's needs and the length of the off-season. The goal is to allow enough time to develop the targeted qualities and prepare the athlete for preseason demands.

Training methods should be selected based on the phase objective and the physical qualities the athlete needs to develop. Bright et al. (2023) found that eccentric training improved strength, jumping, sprinting, and change-of-direction performance in youth athletes. Ghayomzadeh et al. (2025) analyzed 32 studies and found that isometric training produced greater improvements in isometric strength than dynamic training, but similar improvements in isokinetic strength. Moreover, Andersen et al. (2022) reviewed 17 studies and found no significant differences between variable and traditional resistance training in improvements in maximal strength and muscle power. Although these studies examined different training methods, populations, and outcomes, they suggest that improvements can be achieved through more than one approach without establishing a single method as superior across all outcomes. However, their selection should depend on the athlete's needs, the objectives of each phase, and the time available to develop and transfer those qualities to sport performance.

Throughout the off-season, the athlete's response to training should help determine whether adjustments are needed. Repeated assessments, readiness, recovery, and progress toward

training goals can help guide changes in volume, intensity, or exercise selection. Although the accumulation and intensification phases provide structure, the coach should be willing to adjust the program when the athlete's response indicates a need rather than following the original plan too dogmatically.

In-Season Maintenance and Volume Management

Once the competitive season begins, the focus of strength training shifts from developing physical qualities to maintaining them while accounting for the added demands of practices, games, travel, and recovery. The challenge is to provide enough training to maintain the qualities developed during the off-season without adding unnecessary fatigue that could affect the athlete's readiness for competition.

Reducing training volume while maintaining intensity may allow athletes to maintain strength without adding unwanted fatigue during the competitive season. Clemente et al. (2025) reviewed 17 studies comparing lower- and higher-volume resistance training in team-sport athletes and found no significant differences in overall physical fitness outcomes. Although the authors rated the evidence as very low certainty because of small sample sizes, differences in training programs, and risk of bias, these findings suggest that lower-volume training may be a reasonable option. However, they do not establish that lower and higher volumes are equally effective. Coaches can use this evidence to guide decisions and adjust training volume based on each athlete's playing time, recovery, and response to training.

An athlete's training needs also depend on playing time and competitive schedule. For example, a starter playing significant minutes may require less additional training volume than a teammate receiving limited playing time. One practical approach is to prioritize essential exercises and, when appropriate, reduce or remove accessory and remedial lifts while

maintaining sufficient intensity to support the intended training adaptations. Rather than reducing everyone's workload by a predetermined percentage, adjustments should account for each athlete's total workload, readiness, and recovery.

Throughout the season, athlete feedback, training performance, and periodic assessments can help determine whether the program is maintaining the intended physical qualities. If an athlete begins losing strength or another quality, increasing training volume should not automatically be the first response. Before making changes, evaluate factors such as practice demands, playing time, travel, sleep, recovery, injury status, and the existing strength workload. The goal is to maintain enough of a training stimulus to preserve the qualities developed during the off-season without adding more fatigue than the athlete can recover from.

Implications for Practice

For strength and conditioning coaches, periodization provides a structure for organizing training across the competitive year, but how that structure is applied depends on the individual athlete. The competitive calendar determines how much time is available, while the demands of the sport, the athlete's individual needs, assessment results, training history, readiness, and recovery help determine how to use that time. Coaches need to understand the objectives of each training phase and be willing to make adjustments rather than follow a predetermined, inflexible program.

Assessment helps identify which physical qualities need development, while repeated assessments help determine whether training is producing the intended results. Exercise selection and training methods should be based on those needs and each phase's objectives. As the athlete progresses, assessment results and training performance can help determine whether to continue with the original plan or place greater emphasis on another physical quality.

Training priorities also change throughout the competitive year. Although the physical qualities being developed vary considerably by sport, position, and the athlete's individual needs, common off-season priorities in team sports include explosive strength, reactive strength, speed, acceleration, and change-of-direction ability. Once the competitive season begins, the priority shifts toward maintaining those qualities while managing practices, games, and recovery. Throughout both periods, the athlete's readiness and response to training should guide adjustments to volume, intensity, and exercise selection.

Research provides a map for programming decisions, while professional experience helps coaches navigate situations they have encountered before, either through their own work with athletes or by learning from colleagues. Experience can help identify which approaches have worked in similar situations, but those experiences may not apply to every athlete. Therefore, research findings, assessment results, athlete monitoring, and professional judgment should be considered together, while recognizing that the evidence does not establish one programming approach as superior for every athlete or situation.

Conclusion

Research comparing linear, undulating, and block periodization shows that different approaches can improve physical performance, but the findings do not consistently show one model is superior. Differences in study populations, training duration, and measured outcomes also limit how well these findings apply to different athletes and training situations. Periodization's value lies in providing an organized plan that can be adjusted based on the athlete's individual needs, the demands of the sport, and the competitive calendar.

A structured but adaptable approach allows training to progress with purpose. Assessment helps establish the initial training direction, while training performance, readiness,

recovery, and competitive demands help determine when to adjust. Although research supports the potential benefits of autoregulation, the effectiveness of specific methods varies, and practical considerations such as equipment availability may influence their use. Similarly, research on training volume suggests that lower-volume approaches may be appropriate during the competitive season, but the low certainty of the evidence limits definitive recommendations. During the off-season, the focus is on developing physical qualities, while the competitive season emphasizes maintaining them and managing fatigue.

The earlier EXSC 8040 paper emphasized combining periodization approaches as a preferred strategy. The research reviewed here provides a better understanding of what the evidence supports and where limitations remain. A hybrid approach may be a reasonable programming choice, but the available research does not establish that combining models consistently produces better outcomes than following a single model. This distinction matters because programming decisions should reflect the evidence rather than assume a more flexible or individualized approach is necessarily superior.

Ultimately, effective programming requires balancing structured planning with the ability to respond to changing circumstances. Research can inform these decisions, but differences among athletes, competitive schedules, and training environments mean that professional judgment remains necessary. A structured but adaptable approach helps organize training throughout the competitive year, with adjustments based on assessment results, the athlete's response to training, and available research.

AI Use Disclosure

AI tools were used to assist with organizing the manuscript, identifying key topics, and improving grammar, sentence structure, clarity, and readability. The research interpretation and final scholarly arguments were developed independently by the author.

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* Asterisk indicates references added during EXSC 9150 Module 5 redevelopment.