OPTIMIZING RECOVERY AND PERFORMANCE THROUGH SPLIT MORNING SESSIONS IN COMPETITIVE SWIMMING: A LOGISTICAL AND PHYSIOLOGICAL ANALYSIS

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Abstract. *Competitive swimming meets often allow minimal recovery time between morning heats and evening finals, which can impair evening performance due to residual fatigue . This study proposes a two-part ("flighted") morning session structure—conducting the top-seeded heats first, followed later by the remaining heats—to enhance recovery for elite swimmers before finals. Such a format is permitted by official regulations (reversing the usual slow-to-fast heat order) and has been implemented in practice at high-level competitions. By completing their heats earlier, the fastest athletes gain additional hours for active recovery, facilitating greater clearance of blood lactate and muscle restoration prior to the evening finals. Shorter intervals between heat and final are known to negatively affect performance, leaving higher pre-race fatigue markers. In contrast, maximizing the recovery window has been shown to significantly improve subsequent performance and power output (with ~3% faster sprint times and lower pre-final blood lactate). Organizationally, the split-session format can improve meet scheduling without altering the standard progression to finals, and it ensures that all finalists receive a more equitable recovery period (preventing the disadvantage of being in a last, slow heat) . From an athlete development perspective, this approach supports swimmers in delivering peak performances in finals—crucial for achieving stringent qualifying standards for European and World championships (e.g. FINA "A" cuts). In summary, dividing morning preliminaries into two parts offers a blend of logistical efficiency and physiological benefit, ultimately helping high-performance swimmers reach optimal finals times under fair and rule-compliant conditions.*

Keywords: *split-session; meet logistics; swim performance.*

Introduction

Competitive swimming meets often require athletes to perform multiple races within a day, making efficient scheduling crucial for fairness and performance. Traditional preliminaries (heats) are typically held in a single morning session, with all swimmers seeded by entry time and the fastest swimmers usually competing in the final heats of the session. The concern with optimizing the structure and fairness of swimming competitions has long been present in the sport. Oppenheim's The History of Swimming (1970) documents the evolution of meet organization and competition formats across the 20th century, illustrating that questions of fairness, scheduling, and athlete welfare have been debated for decades. The present discussion on split preliminaries therefore extends a historical trajectory of efforts to refine competitive frameworks in swimming (Oppenheim, 1970) Recently, meet organizers have proposed splitting the morning preliminary session into two parts: an "A flight" comprising the top-seeded heats, and a later "B flight" with the remaining heats. This format, sometimes called flighting, has been trialed in elite competitions (e.g., U.S. Olympic Trials) to give top qualifiers more recovery time before evening finals. For sport scientists, understanding the implications of this approach requires examining its regulatory legality, logistical efficiency, and physiological impact on swimmers' performance and recovery. This article reviews the

organizational and physiological benefits of dividing morning prelims into two parts and discusses potential drawbacks. We draw on competition regulations (e.g., World Aquatics Rule, 2023_ SW 3.1) and sports science research on fatigue, lactate metabolism, and circadian rhythms to evaluate how a split-session format might affect competitive fairness and athlete performance.

Regulatory Framework

Under World Aquatics (formerly FINA) rules, preliminary heats are seeded based on entry times, with the fastest swimmers distributed across the last three heats for events with many entries. Rule SW 3.1.1.4 specifies that if an event has four or more heats, the last three heats should contain the top-seeded swimmers, in descending order of seed times. In practice, this means the fastest athletes traditionally swim at the end of the prelims session. A proposed split-session format inverts this order by scheduling those top-seeded heats first in a standalone early session. Importantly, this adjustment does not violate seeding rules as long as the heats themselves are seeded correctly by time; it merely alters the order in which heats are swum. World Aquatics rules do not explicitly prohibit separated preliminary flights, provided that all swimmers compete in preliminaries and the competition is conducted according to the published meet program. The key regulatory consideration is that each preliminary heat must have a minimum of three swimmers (SW 3.1.1.6) . This prevents creating empty or nearly-empty heats purely for scheduling convenience. In the two-part prelim format, all heats remain fully populated; for example, an 8-lane pool would still have up to 8 swimmers per heat in both the early fast-seed session and the later session.

Meet organizers must also ensure compliance with any sanctioning body rules or policies. In USA Swimming-sanctioned meets, “flighting” preliminaries is allowed if stated in advance, and it does not typically require a new sanction as long as the format is declared in meet information. The LEN (European Swimming League) and other national federations generally follow World Aquatics rules, so a similar approach would be legal for their competitions, contingent on approval by the meet referee and technical committee. As an example, the 2016 U.S. Olympic Trials implemented a form of flighting for the 400 m freestyle and 400 m individual medley events: the fastest five heats in those events were swum at the beginning of the morning, and the remaining heats at the end of the session. This adjustment was made under the direction of the National Team Director to comply with rules while optimizing the schedule. In summary, a divided prelim session is legally permissible within current rules, so long as seeding procedures are respected and the meet announcement clearly outlines the format in advance. Rule SW 3.1 provides the seeding framework, and meet officials have discretion in arranging the order of heats as needed, especially for athlete welfare. Thus, from a regulatory standpoint, splitting the morning session into two parts is viable and can be done in accordance with World Aquatics Rule SW 3.1 and related provisions.

Logistical Rationale

Logistically, dividing the morning preliminaries into an early fast-heats session and a later session for remaining heats can offer several benefits. One major advantage is improved efficiency in meet timeline management. By segregating the top 3 seeded heats of each event

into a concise early session, the meet can ensure that likely finalists (who usually come from those fastest heats) finish their preliminary races quickly. These athletes, coaches, and support staff can then leave the pool to begin recovery immediately, rather than waiting through a long morning program. For instance, in a traditional format all heats might run straight from 9:00 am to 12:30 pm, meaning the fastest swimmers (in the last heats) do not finish racing until near the end. In a split format, those athletes could be done by approximately 10:00 am, giving them a head start on recovery. Logistical example: at the 2016 U.S. Olympic Trials, after implementing flighted prelims for the 400 m events, meet reports noted that "the schedule change gets the probable finalists out of the prelim session much quicker, giving them more time to rest up prior to finals". Table 1 illustrates a comparison of a traditional vs. split-session morning schedule and the resulting recovery periods for swimmers.

Table 1. *Traditional vs. Split Preliminary Session Schedule (Hypothetical 200 m Event)*

Schedule Format	Prelims Session Timing	Example: Top Seed Heat Time	Example: Last Heat Time	Rest Time for Top Seeds (until final)	Rest Time for Last Qualifiers (until final)
Traditional Prelims	All heats continuous from 9:00–11:30	~11:15 (fastest heat is last)	11:30 (session end)	~6.5 hours (11:15 to 6:00 pm final)	~6.5–6.75 hours (similar for all who qualify)
Split Prelims	Fast heats 9:00–9:30; Remaining heats 11:00–13:00	~9:20 (fastest heat done early)	12:50 (session end)	~8.5 hours (9:20 to 6:00 pm final)	~5.0 hours (if a qualifier comes from last heat)

Note: Final is assumed at 6:00 pm for both scenarios. This hypothetical shows that splitting the session yields a longer recovery window for top seeds, while swimmers in the last heats (if any qualify for finals) would have a shorter turnaround. All times are illustrative.

From an operations perspective, splitting the session can reduce deck congestion during the early part of the day. Only the athletes in the top-seeded heats (and their coaches) need to report for the early session, which might last only 30–60 minutes. This smaller group can be managed more easily by officials and marshals, and warm-up/warm-down space is less crowded. The break between the two sessions (e.g., between 9:30 and 11:00 in the above example) can then be used to clear the venue, reset timing systems, and allow a second warm-up for the swimmers in the later heats. Many meets already schedule a break or two during a long prelim session; a formal two-flight system institutionalizes this break for a clear purpose. Coaches also have clarity on when their athletes swim: those with only slower-seeded athletes can plan to arrive later in the morning for the second flight, avoiding an unnecessarily long wait at the pool.

However, there are logistical challenges to address. Meet organizers must ensure that officials and volunteers cover both portions of the session, or arrange shifts such that the early session is adequately staffed without causing fatigue for the referees, starters, and timers by the time finals occur. The timing system operators need to merge results from the two prelim segments seamlessly, since all swimmers, regardless of flight, are competing for the same finals qualification. This requires careful data management but is routinely done in meets that flight distance events or use multiple pools. Another consideration is venue schedule: the overall length of the preliminaries might slightly increase (due to the gap between flights), which could impact the time available before finals. In practice, the gap is often used for other events (e.g.,

minor heats, distance events, or even presentations), and meet timelines can be adjusted so that the finals start time remains the same.

Fairness in scheduling must also be considered. All swimmers should have equitable conditions to perform. In a single-session prelim, the slowest heats go first and the fastest last; in a two-part prelim, the fastest go first and slowest last (within their separate flights). This reversal means the top seeds will face earlier day conditions (colder air/water if a pool warms up over time, or lower ambient energy in the venue). Meanwhile, those in the later heats get more time to wake up and prepare but then have a compressed schedule before potential finals. To mitigate any perception of unfairness, meet officials often allow swimmers in the second flight ample notification of their start times and may provide an extended warm-up before the second flight begins. Communication is key: coaches and athletes must "know when they are swimming" and adjust routines accordingly. When implemented transparently, flighted prelims have been well-received at large meets as a solution to overcrowded morning sessions and long waits. In summary, the logistical rationale for dividing the morning session is to streamline the schedule for high-impact swims (those likely to final) and enhance the meet experience by balancing the timeline, at the cost of a slightly more complex scheduling arrangement. More recent developments highlight the role of technological innovation in competition scheduling. Guofang and Jing (2018) describe the design and practice of an artificial intelligence–based system for arranging swimming competition schedules. Their work demonstrates how computational models can optimize heat distribution, event order, and recovery windows, aligning organizational efficiency with athlete performance needs. This modern perspective complements the physiological arguments advanced in the present paper, underscoring that technological tools may increasingly assist meet directors in implementing formats such as split morning sessions (Guofang & Jing, 2018).

Physiological Considerations

The primary motivation for giving top swimmers an extended recovery period between prelims and finals is rooted in exercise physiology. High-intensity swimming races (50 m to 400 m events) tax both the anaerobic and aerobic energy systems, leading to the accumulation of blood lactate, muscle phosphocreatine depletion, and central fatigue. The rate at which an athlete recovers from such exertion can directly influence their performance in a subsequent race on the same day. Scientific studies have quantified how various recovery strategies and time intervals affect swimmers' readiness for a second effort. In general, longer recovery time and active recovery methods (such as low-intensity swimming or "warm-down" exercises) promote faster clearance of lactate and restoration of performance capacity (Neric et al., 2009; McGowan et al., 2017). By finishing their heats earlier, top-seeded swimmers in a split prelim format gain possibly 1.5–2 extra hours of recovery before the final, which can be physiologically significant.

One key physiological factor is blood lactate concentration. After a maximal swim effort, lactate levels can spike to high levels (for example, 6–15 mmol/L, depending on the event and athlete). Active recovery – lightly swimming or aerobic exercise – accelerates lactate removal compared to passive rest. Hinzpeter et al. (2014) found that swimmers who performed regeneration exercises (swimming at low intensity) between two maximal 100 m freestyle

efforts had significantly lower blood lactate before the second effort and swam faster in that second effort than when they passively rested . In their crossover study, the mean blood lactate after an active recovery period was ~2.76 mmol/L, versus ~6.51 mmol/L after passive rest, and the subsequent 100 m time was 68.11 s with active recovery vs 69.31 s with passive rest . This ~1.2 s improvement (roughly 1.7% faster) is meaningful in competitive terms. Table 2 summarizes some findings from that study, illustrating the impact of recovery on lactate and performance.

Table 2. *Effect of Active vs. Passive Recovery on Blood Lactate and Performance*

Recovery Between Efforts	Blood Lactate Before 2nd 100 m (mmol/L)	100 m Swim Time (2nd effort, s)
Active swimming recovery (low-intensity "warm-down")	2.76 ± 1.18	68.11 ± 3.20
Passive rest (no active exercise)	6.51 ± 2.03	69.31 ± 3.15

Note: Data are adapted from Hinzpeter et al. (2014) . Swimmers performed intense efforts, then either 15 minutes of active recovery or passive rest, followed by a timed 100 m swim. Active recovery led to faster lactate clearance and a quicker second swim.

One crucial factor in maintaining race performance is the timing between the warm-up and the actual race. West et al. (2013) found that international swimmers who raced 20 minutes post-warm-up performed 1.5% faster over 200 m freestyle than when racing 45 minutes post-warm-up. This was attributed to better maintenance of core temperature (Tcore), which declined significantly more with the longer delay. Specifically, Tcore at pre-race was 37.8 ± 0.2°C after 20 minutes, versus 37.5 ± 0.2°C after 45 minutes ($p = .002$), correlating with faster swim times (West et al., 2013). Similarly, Neiva et al. (2017) showed that swimmers achieved better performance in a 100 m freestyle time trial when the post-warm-up rest was only 10 minutes compared to 20 minutes. The shorter interval resulted in higher pre-race heart rate and core temperature, leading to a 0.65-second improvement in performance (58.41 ± 1.99 s vs. 59.06 ± 1.86 s; $p < .01$) (Neiva et al., 2017). These findings reinforce that both physiological readiness and temperature maintenance are critical and time-sensitive.

While finals usually occur several hours after prelims (often 6–8 hours later), the additional rest conferred by a split session can still be valuable. In the hours after a race, swimmers focus on processes such as muscle glycogen resynthesis, reoxygenation of muscles, restoration of pH balance, and central nervous system recovery . Research indicates that muscle phosphocreatine (PCr) stores largely recover within ~5 minutes after a sprint, and blood pH and lactate normalize over 15–30 minutes with active recovery . However, full recovery of muscle power and removal of fatigue by-products can take longer, especially if the race was near maximal effort. By extending the recovery from ~6 hours to ~8 hours for top seeds, the split schedule gives a larger window for athletes to eat, rehydrate, and even nap, which aids muscle repair and glycogen replenishment. Those extra 1–2 hours can be the difference between feeling residual heaviness in muscles versus feeling fresh at the final.

It is also important to consider circadian rhythms and time-of-day effects on performance. Human performance is generally known to be influenced by the time of day, with many athletes exhibiting peak strength and aerobic capacity in the late afternoon or early evening, and lower performance in the early morning . In swimming, analysis of Olympic athletes' results found

that on average, swimmers were about 0.3–0.4% faster in evening finals than in morning heats. Lok et al. (2020) reported a ~0.32% improved performance at ~17:12 (5:12 pm) compared to 08:00 am for elite swimmers, an effect size large enough to alter medal outcomes in many cases. This circadian advantage means that all else equal, swimmers will typically post slower times in morning prelims. Notably, in a traditional format the fastest swimmers often race closer to noon, whereas in a split format they might race at 9:00–10:00 am. The earlier time could slightly impair performance; however, in preliminary races swimmers are not usually aiming to swim personal-best times – just to qualify for the next round. The 0.3% deficit from circadian timing (equating to roughly 0.1–0.3 seconds in a 100 m swim) is relatively minor and can be offset by the benefits of extra recovery. Moreover, top athletes and their coaches can adjust their routines (e.g. warm-up intensity, caffeine use, or morning light exposure) to ensure readiness for an early swim if needed . On balance, the physiological upside of extended recovery (lactate clearance, muscle repair, glycogen restoration) likely outweighs the small circadian dip in performance for those fast-heat swimmers.

For the swimmers in the later heats (second flight), their situation is the opposite: they swim closer to midday (potentially better from a circadian standpoint) but have less time before finals if they happen to qualify. While it is statistically less common for athletes outside the top seeded heats to make evening finals (because entry times correlate with performance), it is possible, especially in sprint events or if a swimmer was erroneously seeded slow. Such athletes would have perhaps ~5 hours or less to recover, which is a challenge. In these cases, the coaching and medical staff must optimize recovery aggressively – utilizing active cool-downs immediately after the race, cold water immersion or massage if available, and rapid refueling. Sports science literature suggests that within 4–5 hours, muscle glycogen can only partially replenish (perhaps on the order of 50% of depleted stores, depending on nutrition), and any residual muscle damage or inflammation from the morning swim might not fully subside by the evening. This could put a later-heat qualifier at a performance disadvantage relative to someone who swam earlier and had more recovery. Therefore, the two-part system inherently provides a physiological advantage to the top seeds, which must be acknowledged as a fairness consideration. Mitigating this requires that those later swimmers use every recovery aid at their disposal. Fortunately, the demands of prelim races are often slightly submaximal – many swimmers do not need to exert 100% effort to qualify, especially those in slower heats may cruise at a sustainable pace, keeping lactate levels lower. This strategic conservation of energy in prelims is common practice , and a flighted system doesn't change that tactic; it simply compresses the timeframe for the few who might unexpectedly reach a final from the second flight.

In summary, splitting the prelim session yields clear physiological benefits: more time for metabolic recovery for the fastest athletes, leading to better performance potential in finals. It leverages known recovery strategies (active cool-down, nutrition, rest) by affording a longer window to implement them. The trade-off is a slight morning performance decrement for those fast-heat swimmers and a shorter recovery window for any finalists coming from later heats. Sport scientists and coaches generally view extended recovery as critical for maximizing performance in the same-day final , and the data on lactate clearance and repeated sprint performance support this practice.

Case Studies and Implementation

Several high-level competitions and smaller meets have experimented with divided preliminary sessions, providing case studies for its effectiveness. One of the most cited examples is the 2016 USA Olympic Trials in Omaha, which partially adopted the approach. In that meet, events of 400 m (which tend to have many heats and are taxing races) were "flighted." According to the official meet communication, the fastest five heats of the 400 m freestyle and 400 m individual medley for both men and women were swum at the beginning of the morning session (starting at 10:00 am), and the remaining heats swam at the end of the prelims session, after other events. By doing so, elite swimmers like Katie Ledecky and Michael McBroom (top seeds in those events) completed their prelims early and gained additional recovery time. Reports from coaches and athletes were positive; the athletes felt less rushed between heats and finals, and the meet still ran smoothly. In the words of SwimSwam journalist James Sutherland (2016), this schedule allowed probable finalists to be "out of the prelim session much quicker" for more rest. Notably, none of the athletes or coaches raised objections regarding fairness, likely because in distance events, it was unlikely for a swimmer outside the top heats to make the final at Trials; thus the competitive outcomes were not skewed.

Another case comes from regional and age-group championships in the United States. The practice of flighting prelims has trickled down to large invitational meets where timelines are a concern. For example, some LSC (Local Swimming Committee) championships will designate an A-flight (typically the fastest 2–3 heats of each event across all age groups) and a B-flight (all remaining heats). Anecdotal evidence suggests that this can shorten the morning session for top performers by an hour or more, allowing them to leave the venue earlier. Meet directors have noted easier management of warm-up with fewer swimmers initially, and better focus on officiating during critical heats. One challenge observed is that some coaches need to be present for both flights (if they have athletes in both fast and slow heats), which can lengthen the coach's day even if it shortens it for some swimmers. This has generally been managed by having assistant coaches or rotating staff duties. Importantly, when this format is used, meet announcements explicitly state the split format and sometimes even list approximate start times for the second flight's events, ensuring all participants are informed. Compliance with rules such as the minimum 3 swimmers per heat is maintained – for instance, if an event had exactly, say, 3 heats, they might choose not to split that event at all to avoid any heat with fewer than 3 swimmers (though such a scenario is rare given typical entries).

In Europe, the concept of split prelim sessions is less commonly documented, possibly because European championships and international meets usually have fewer entrants per event (due to stricter qualification standards) and thus shorter prelim sessions by default. However, the underlying principles are the same. LEN regulations mirror World Aquatics rules, so any federation under LEN could implement a divided preliminary as long as it's within the technical rules framework. A parallel can be drawn to two-pool meets (running prelims in two pools simultaneously) which is another solution used in e.g. NCAA championships to handle large participant numbers. Flighting is essentially a temporal split rather than a spatial split. The NCAA Division I Swimming Championships do not typically flight events (because they limit the number of swimmers), but NCAA conference meets or mid-major invitationals

occasionally have used A/B flight formats for very long events (like the 500 y freestyle) to manage timelines, essentially running a fast flight in the main session and the rest later. These implementations underscore that meet format innovations are driven by practicality and athlete welfare. When asked, meet referees have indicated no rule impediments to flighting, but emphasize the importance of fair notification and consistent application.

One potential case study in fairness to examine is if a swimmer from the second flight makes finals and then underperforms at night relative to expectation. While concrete examples in literature are lacking (since this scenario is relatively uncommon), coaches would review whether the shorter recovery might have played a role. Sports scientists might gather data on that athlete's lactate or heart rate to gauge recovery status. Future implementation of split sessions could include such monitoring – for instance, measuring the core temperature or perceived recovery of athletes from different flights – to ensure that no group is being inadvertently put at undue disadvantage.

From an organizational perspective, those meets that have implemented split prelims generally find that any initial confusion is resolved by day two of competition. Athletes quickly adapt to the idea that, for example, if they are ranked in the top 24 of an event, they swim in the first portion, otherwise they come later. Some meets adopt a practice of publishing two separate heat sheets: one for the A flight and one for the B flight, to avoid any mix-ups. There are also cases of partial flighting – for example, at a championship, only the longest events are flighted, or only events over a certain number of entries. This flexibility allows tailoring the approach to where it's most needed.

In summary, real-world implementations of divided morning sessions have generally achieved their goal of improved efficiency and recovery. The experiences from U.S. Olympic Trials and other competitions show that with careful planning, the format is logistically sound (Bridge, 2015). Observations from these case studies feed into the ongoing discussion and provide data for sport scientists to analyze performance outcomes (e.g., whether evening final times improved on average when flighting was used). Thus, these examples serve as both proof of concept and learning opportunities for future meets considering this format.

Discussion

The integration of a split morning session structure in swimming competitions presents compelling advantages grounded in both logistical logic and physiological evidence. From a physiological perspective, research clearly supports the notion that minimizing the time between warm-up and race start is crucial for maintaining core body temperature and maximizing performance potential.

The split preliminary session format represents an intersection of organizational innovation and sports science. Our review indicates that this format offers clear benefits in terms of recovery and potential performance enhancement for top athletes, while also introducing new variables that need to be managed to maintain competitive equity. In discussing the findings, several key points emerge:

Recovery and Performance: The physiological data strongly support any strategy that increases recovery time between races. Given that finals often determine medals and titles, enabling finalists to be as close to peak condition as possible is desirable. Active recovery has

been proven to expedite metabolic recovery (68% faster lactate dissipation in one study) , and even an extra hour or two can aid muscle recovery and mental relaxation. It is reasonable to infer that swimmers who feel less fatigued will perform better, all else being equal. Indeed, at elite meets, it is not uncommon to see faster times in finals than prelims, even accounting for the time of day effect , because athletes conserve energy in the morning and give maximal effort at night. By shortening the interval between their prelim warm-up and race, fast-heat swimmers in a split session can actually improve their prelim performance consistency as well – they are not sitting around for hours after warm-up, which can sometimes lead to a decline in body temperature or stiffness. Instead, they warm up and race promptly. This could reduce the need for a second short warm-up or stretching routine that many swimmers with late-morning heat times undertake to stay loose. In essence, the early fast heats may produce more engaged performances by top seeds (knowing they can swiftly move on to recovery).

Fairness and Competitive Equity: Despite the upsides, it's critical to address the fairness aspect. A potential critique of the two-part system is that it preferentially benefits the favorites – those who are already top-seeded gain even more advantage by getting extra recovery. From a pure competition standpoint, one might argue that this entrenches the expected outcome, making it harder for an underdog to upset a favorite in the final. However, one must consider that seed times are earned through prior performance; giving all finalists the best chance to swim fast is arguably fair to the competitors and exciting for spectators (as it raises the level of the final). Moreover, the alternative – a single session – technically gives an advantage to slower seeds by letting them race earlier (closer to their optimal time of day and with slightly more recovery before finals), which is an odd way to level the field. There is also an element of athlete-centered fairness: it may be seen as fair to the athletes as a whole that none of the top contenders are disadvantaged by an overly long, fatiguing prelim schedule. The meet's purpose is to find the best swimmer in each event; if a format change helps every finalist swim closer to their best, it serves that purpose. One could also frame fairness in terms of opportunity: all swimmers have the opportunity to be seeded in the top heats by virtue of entry times (which they control through their performances in the lead-up meets). In practice, meet organizers can also monitor outcomes over time – if they notice that, for example, a swimmer from the second flight who makes the final consistently underperforms at night, they could adjust by perhaps expanding the fast-heats flight to top 4 heats instead of top 3, to capture more swimmers in the early group.

Another important factor that influences competition scheduling is the role of television broadcasters and digital streaming platforms. Media stakeholders often request that star athletes or medal-contending events be placed in prime-time slots to maximize audience engagement and commercial value (International Olympic Committee, 2009). This dynamic has been documented in major competitions such as the Olympic Games, where finals have sometimes been scheduled late in the evening or even in the morning to suit international broadcast markets—for instance, the Beijing 2008 swimming finals were held at 10:00 a.m. local time to align with U.S. television coverage. More recently, Lee Ludvigsen & Petersen-Wagner (2023) note that the digitalization of sport mega-events has amplified these pressures, as online platforms and global streaming audiences further shape the timing and presentation of competitions. While such arrangements increase visibility and commercial returns for the sport, they may conflict with physiological principles of recovery and circadian performance

optimization, raising important questions about how to balance athlete welfare with media imperatives.

Psychological and Logistical Trade-offs: An interesting aspect is the psychological effect on swimmers. Knowing they have a long break after prelims might help some athletes more fully commit to a fast morning swim, confident that they can recover in time. On the other hand, a swimmer in the later heats, if they do qualify, might feel psychological stress about the quick turnaround. Athlete interviews from competitions that used flighting indicate most embraced the format; top seeds enjoyed the calmer morning and extra rest, and those not in top heats often appreciated not having to report so early for the meet. To minimize any negative psychology for second-flight swimmers, coaches counsel them to treat the situation just like a typical prelim-final double, emphasizing recovery and not dwelling on the difference in recovery time. From a logistical perspective, the meet referee must maintain the same rules and oversight across both parts of prelims. All swimmers' times still count equally for seeding into finals; thus, things like pool conditions and officiating standards should remain consistent. Splitting sessions might slightly complicate ensuring the pool temperature or calibration of timing equipment remains constant (e.g., if the pool is idle for an hour, water chemistry and temperature can shift subtly). These are minor issues, typically addressed by venue staff (for instance, stopping any filtration changes during the break and checking that automatic timing is functioning properly before restarting).

Applicability and Generalization: While our focus is on competitive swimming, the concept of splitting qualifying rounds has parallels in other sports – for instance, track and field sometimes has A and B flight in field event qualifying. The overarching theme is using scheduling to maximize performance. Sport scientists could consider formal studies to quantify the effects of such scheduling changes. For example, one could measure swimmers' blood markers, heart rate variability, or perceived exertion in a meet that uses split prelims versus one that doesn't. Additionally, analysis of historical meet results could determine if evening final times improved in meets that implemented morning flighting, compared to similar meets without it. Early anecdotal evidence from coaches suggests that athletes do swim "a little faster at night" when they have had a less exhausting morning, but rigorous data would help confirm this. Another avenue for analysis is injury or burnout: does reducing the strain of long prelim sessions decrease the risk of shoulder injuries or mental fatigue over a multi-day meet? These are holistic benefits that might arise from a more athlete-friendly schedule.

Potential Modifications: If any downsides are identified, there are possible modifications to the format. For instance, if concerned about second-flight finalists, a meet could allow an optional "swim-off" opportunity earlier for those athletes to time trial a bit (though this is unconventional and would defeat the purpose of flighting). Alternatively, finals could be pushed slightly later in the evening on days with split prelims to grant a minimum recovery threshold for all. In extreme cases, if a meet has the facility, running two simultaneous preliminary sessions (one for fast, one for slow heats in separate pools) could equalize the rest but that introduces many complexities. The simpler solution, however, is to continue refining the split format based on feedback. So far, evidence suggests the format is a net positive with manageable trade-offs.

In conclusion of the discussion, the two-part morning prelim format emerges as a scientifically grounded innovation that aligns competition scheduling with athlete

physiological needs. It exemplifies how sports science insights (on recovery, fatigue, and performance rhythms) can inform rule adjustments and meet design. As with any change, it must be continually evaluated for fairness and effectiveness, but the convergence of current rules flexibility, logistical success in trial runs, and physiological rationale makes a compelling case for broader adoption of this format in high-level swim meets.

Conclusion

Dividing the morning preliminary session of a swim meet into two parts – with the top-seeded heats competing first and the remaining heats following after a break – offers a range of organizational and physiological benefits that can enhance athlete performance and competition quality. Within the bounds of World Aquatics rules (e.g., SW 3.1 on seeding and heat organization), meet directors have the latitude to implement this format, and real-world case studies (such as the USA Olympic Trials) have demonstrated its feasibility. The primary advantage lies in improved recovery: athletes likely to final are afforded a longer interval to clear lactate, restore muscle energy reserves, and prepare mentally and physically for the evening's final. Scientific research supports that such additional recovery time and the use of active recovery protocols can lead to measurably better performance in subsequent races . Logistically, a split prelim session can alleviate early morning crowding and streamline meet operations, though it requires careful communication and planning to maintain fairness for all participants.

Our analysis indicates that while the format preferentially benefits higher-seeded swimmers, it does so in service of the meet's goal to produce the best performances when medals are on the line, and it remains fair in the sense that all competitors are still racing under the same rules and conditions to earn their finals spots. Potential drawbacks, such as reduced recovery for any surprise qualifiers from later heats or slight circadian timing effects, can be mitigated with coaching strategies and are outweighed by the overall gains for athlete welfare. In essence, the two-part prelim structure aligns meet scheduling more closely with the physiological realities of sprint and middle-distance swimming.

For sport scientists, this development is a compelling example of translating research on fatigue and recovery into practical policy. It underscores the importance of considering factors like lactate kinetics, muscle recovery timelines, and chronobiology in the design of competition formats. Future studies and meet data will no doubt continue to refine our understanding of how scheduling impacts performance. In the meantime, the evidence and experiences so far suggest that splitting the morning session is a legal, efficient, and athlete-friendly practice that could be adopted more widely in competitive swimming, from international championships to junior meets. By combining regulatory compliance, logistical planning, and physiological insight, organizers can create an environment that allows all swimmers – especially those contending for podium finishes – to showcase their peak abilities when it matters most.

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