

Timeout as a strategic tool in Handball: Decision-making and performance processes' analysis

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Abstract:

Timeout in Handball serves as a strategic intervention that allows coaches to manage game dynamics and make real-time adjustments in order to enhance their team's performance. The present study aimed to analyze the timeout as a strategic tool in Handball, investigating the factors that lead to its use, the content of the coach's speech during the break, and its effects on team performance. The study group consisted of four Portuguese male coaches, all holding the Sports Coach's professional title – Level IV (Master Coach), with over ten years of experience. Their interventions were observed in 124 timeouts recorded during national competitions in U16, U18, and Senior categories. The interventions were recorded using a validated observation grid, complemented by semi-structured interviews subjected to content analysis, with the aim of understanding the communicational intentions and perceptions regarding the intervention's effectiveness. The results reveal a predominance of tactical statements, followed by psychological and technical content. It was found that discourse is adapted to the competitive context: in youth categories, it assumes a pedagogical and motivational character, while at high-performance level it becomes more directive and focused on strategic details. Communication's clarity, brevity, and objectivity, as well as the use of visual aids, emerge as key determinants of timeout effectiveness. The timeout is characterized as an essential tool for technical-tactical and emotional regulation, whose effectiveness depends on time management, discourse coherence, and suitability to the competitive level. It is recommended to implement communication specific training programs applied to coaching and to deepen research that relates the interventions' content to objective performance indicators.

Key Words: Coaching strategies; Game management; Sports training; Tactical-technical strategy; Team communication.

Introduction

Invasion team sports, due to the set of characteristics they entail, tend to become increasingly complex, and Handball is no exception. According to Solovey et al. (2020), the sport has undergone constant evolution, driven by the increase in the number of participants (captured through scouting and talent identification processes), combined with the development and refinement of training processes and methods (Bjørndal et al., 2018; Lidor et al., 2005; Wrang et al., 2018).

Handball's progress, from the perspective of Meletakos et al. (2025), leads to the need to analyze the game's strategy and tactics to determine its influence on athlete performance. This need, according to Plokhikh et al. (2024), is due to significant advances in training methodology and computational technologies, which allow the capture of more and more game indicators, thereby creating increasing opportunities for tactical-technical analysis and approaches.

Within the growing interest in analyzing Handball's strategies and performance factors, the coach's figure also emerges as the one responsible for the game's multifactorial analysis, in order to properly guide their athletes (Gomes, 2014). Coaches can regulate tactics during the match to constant readjustments based on their team's and opponents' performance (Gomes et al., 2017; Vázquez-Estévez et al., 2025). All these actions have a direct impact on collective performance, reflected in substitutions, tactical systems, and/or timeouts (Lombard & Cloes, 2021). Timeout is appreciated as a particularly important action due to its direct influence on the game's outcome, throughout its rhythm and intensity's manipulation, and can serve to change the course of a game that is progressing negatively, to allow a short rest period for athletes (Blything & Blything, 2024), to break the opponent's offensive momentum, or to make technical and tactical adjustments during the match. Its study's relevance is well established in the literature by authors such as Gutiérrez-Aguilar et al. (2016), Prieto et al. (2016), and Halldorson (2016), who have dedicated deeper analysis to it.

Considering its usage rules - in this case, the limitation of three timeouts per game (only two can be used in the same half and only one allowed in the last five minutes of the game), as well as its short duration (one minute) - Drewson (2015) and López-Laval et al. (2021) highlight the mental demand required of coaches

when requesting timeouts, especially when called in the match's final moments, thus emphasizing the need to adopt strategies that maximize its effect.

Information must be conveyed clearly, concisely, and objectively, supported by materials (visual or auditory) aimed at increasing athletes' intelligibility and understanding, in order to reduce their cognitive load and thus avoid misinterpretations of the coaches' instructions, while simultaneously enhancing their offensive and defensive effectiveness (Lorenzo et al., 2013; Vázquez-Estévez et al., 2025).

Wagner et al. (2023) state that individual performance is as important for collective success as the need to measure that same ability, even though this is a complex process in sport, especially in invasion team sports, due to the multitude of factors involved in these open tasks and the difficulty in transforming behaviors into tangible indicators. Exclusive reliance by coaches on their subjective perception to analyze the game may negatively influence their decision-making and, consequently, athlete performance, since relevant performance indicators are typically benchmarked by scientifically valid measurement instruments (Kausel et al., 2019; McIntosh et al., 2018).

Sarmiento et al. (2022) list various approaches framed within the domain of game analysis, so in Handball's specific context, the commonly accepted classification involves: descriptive analysis (Saavedra et al., 2020) and comparative analysis of defensive patterns, tactics, and competitive scores (de Paula et al., 2020); contextual game analysis (Debanne, 2018); and predictive analysis (goals, rankings, substitutions, and exclusions) (Ferrari et al., 2020; Ferrari et al., 2022; Gumus & Gencoglu, 2020; Trejo-Silva et al., 2020).

Within this specialized context, timeout has been conceptualized as a strategic tool used by coaches to influence game dynamics and promote tactical-strategic adjustments at critical moments of the match. Handball's performance analysis studies, such as that by Gomes et al. (2014), have shown that coaches tend to call timeouts in situations of score imbalance or when a team's immediate performance becomes unfavorable, suggesting that the decision to interrupt play is not random but rather influenced by contextual variables such as goal difference, match period, and recent offensive and defensive performance.

Although Handball's specific literature remains limited, there is general agreement among researchers that timeouts enable not only tactical reorganization and direct communication of instructions to players, but also momentum management and attempts to alter the course of the game when teams experience negative sequences. In related team sports (e.g., Basketball), timeouts have demonstrated potential to disrupt opponents' momentum and facilitate adjustments that may influence subsequent performance, although these effects appear to be context-dependent and not always consistent in the short term (Allgrunn et al., 2023; Assis et al., 2021; Qiu et al., 2025). Despite these findings, there is still a notable gap in literature directly quantifying the effects of timeouts on competitive performance (Samusis, 2024), and especially in the context of modern high-performance Handball. This contemporary empirical insufficiency justifies the need for further research integrating performance analysis methods, situational modeling, and decision-making metrics (e.g., ball possession analysis before and after the timeout) in order to rigorously clarify the extent to which timeouts influence offensive, defensive, and decisional performance in competitive teams.

Within these lines of thought, the present study aims to investigate the timeout in Handball, identifying the reasons that drive the coach to use it and analyzing the content of their discourse during the stoppage. Specifically, the following objectives were defined: 1) to identify and characterize the main scenarios preceding the timeout request; 2) to analyze the coaches' intervention during the timeout; 3) to characterize the timeout's effects request on the athletes' collective performance. Accordingly, timeout data were collected and analyzed across official competitions with the aim of characterizing when and with what impact these moments are activated by coaches, as well as determining whether timeouts are associated with significant changes in performance indicators. The methodology included the coding of competitive context and the assessment of situational variables motivating timeout use, thereby contributing to a deeper understanding of the strategic function of Handball's timeouts.

Material & methods

The study design resulted from a combination of quantitative and qualitative methodologies. Initially, a validated instrument was used to collect coaches' instructions during timeouts. Subsequently, since the goal was to analyze the participants' opinions, attitudes, and representations of their speech during the timeouts, the interview technique was employed, as it was considered the most suitable means to assess the interviewees' social and emotional context (Santos & Lima, 2019). A semi-structured format was chosen for its flexibility in exploring unanticipated topics if deemed relevant. A reference guide was developed to ask open-ended questions, ensuring that the interview was neither rigid nor entirely free, while allowing the interviewee to respond naturally and in more informal language.

Participants

The study group consisted of four coaches who expressed willingness to participate in the data collection process. All participants are male and actively involved in the training and competition process in national tournaments under the Portuguese Handball Federation. Additionally, they each have ten or more years of coaching experience and hold the professional sports coaching certification – Level IV (Master Coach). The

timeouts' collection was carried out during National Championship competitions for Under-16, Under-18, and Senior Women's categories, recording a total of 124 interventions.

Instruments

To classify the coaches' interactions, the "Comments and Instructions during the Timeout" (CCIT) was used. This is an analysis and intervention model designed for teaching and learning contexts, especially in sports, developed by Hastie (1999). The instrument aims to analyze the use of comments and instructions during the timeout period and their influence on athletes' performance (and ultimately, on match outcomes). The CCIT consists of items that influence the quality and effect of instructions during the timeout, divided into four general dimensions: "Technical Statements" (TecS) - related to technical actions' performance; "Tactical Statements" (TacS) - related to game strategy and tactical actions' performance; "Psychological Statements" (PsyS) - referring to the game's emotional and cognitive aspects; and "Other Statements" (OthS). Each dimension is further subdivided into categories, totaling fourteen (coach instructions), as described:

1. TecS - technical corrective (TC): provides corrective information about the player's skill performance; technical positive (TP): makes a positive statement to players about skill performance; technical negative (TN): scolds a player about his/her poor skill performance.
2. TacS - tactical proactive (TP): gives directions about future strategic options; tactical reactive (TR): makes a comment (often negatively) about some decisions the players have made; consequences statements (CS): relate to future events, based upon aspects the players can attend to in the present; asking questions (Q): asks questions related to game actions.
3. PsyS - general encouragement (GE): makes positive reference to players with the purpose of encouraging, increasing confidence of self-esteem; criticism (C): makes negative reference to players who might have made mistakes; attention focus (AF): uses techniques to refocus attention to the "now" statements; reassurance statements (R): makes comments to reassure or relax players.
4. OthS - truisms (T): Comments made that are stating the obvious; non-sequiturs (NS): makes a statement/questions unrelated to the game; hustles (H): brief statements (usually at the end of timeouts) to bring the team together or to reorient the focus.

In turn, the interview guide was structured according to the abovementioned dimensions, resulting in eleven questions divided into four subdimensions aimed at analyzing coaches' behavior during timeouts, from use perspective (function and communication strategies), tactical-technical content, time management (time constraints and discourse organization), and the use of visual aids and real-time data.

After the interviews, content analysis was performed. According to Valle and Ferreira (2016), content analysis refers to a collection of techniques used to examine communication, with the goal of systematically and objectively describing message content in order to generate insights and make inferences about the circumstances in which the messages were created. In this context, content analysis served as a data processing technique to analyze the information collected from the interviews. It helped the researcher describe and interpret the interviewees' narratives, focusing on key points related to the study's topic.

Procedures

Aware of the importance of safeguarding participants' rights and well-being, every aspect of the procedures was carefully designed and executed with ethical considerations at the forefront. This included ensuring transparency, fairness, and respect for individual autonomy. As the initiative in question pertains to a curricular internship, it is important to note that, in accordance with institutional guidelines, there was no requirement to submit the project to an ethics committee. Nevertheless, rigorous ethical practices were conducted with the utmost respect for the participants' rights and well-being. As part of ethical obligations, informed consent from all participants involved in any activities or research initiatives was obtained. This process ensures that each individual is fully aware of the scope, purpose, and potential outcomes of their participation and that they voluntarily agree to be involved. Participants were given the opportunity to ask questions and have their concerns addressed before providing their consent. Importantly, they retained the right to withdraw from any activity at any time without facing any negative consequences. These measures sought at fostering a responsible and respectful environment, promoting trust and collaboration among all parties involved. To safeguard the confidentiality and anonymity of the analyzed teams, their coaches, and the collected data, data was coded and numbered (randomly) for this study.

Results

Between nine and ten statements were recorded per timeout (lasting 60 seconds), distributed on average as follows: one to two technical statements, three tactical statements, two to three psychological statements, and two categorized as "other statements."

Greater variability was observed, in descending order, in "total statements," "tactical statements," "psychological statements," and "other statements" categories. The smallest dispersion was found in technical statements, indicating a more consistent pattern in this domain. This variability may be associated with differences in coaches' speech depending on the team's age group (Under-16, Under-18, or Senior), suggesting communication adaptation to each group's specific needs.

Statements' total number also varied according to the timeout request's origin - whether called by the coach's own team or by the opponent. The literature distinguishes game moments associated with positive or negative "momentum." When a timeout is requested by the opposing team, it is likely that the coach's team is experiencing positive momentum, reducing the need for corrective interventions. Conversely, a timeout requested by the coach's own team may reflect negative momentum, involving a greater number of interventions aimed at error correction.

Regardless of the competitive level (Under-16, Under-18, or Senior), the technical interventions' consistency can be explained by the teams' experience in participating in national competitions. At this level, technical fundamentals are largely consolidated, with most corrections occurring during training. Thus, during timeouts, technical statements tend to focus more on fine-tuning technical execution, particularly in relation to the opposing team's characteristics.

Tactical statements, the most representative category during timeouts, reflect the complexity and diversity of offensive and defensive systems used. Tactical variability induces natural errors during the game, resulting in negative moments that often motivate the timeout request to rectify behaviors and tactical decisions. Regarding psychological statements, significant variation was observed depending on the age group. In youth categories, these tend to have a more motivational and educational character, whereas in the senior level, especially in high-performance contexts, they are more assertive and directive. Timeouts aimed at the Under-18 group showed a combination of both approaches, reflecting the transition between development and performance.

Finally, the "other statements" category was relevant across all levels, as it includes general game observations and instructions related to player substitutions after the match restarts.

Within the technical dimension, the subcategory of "corrective technical statements" was the most frequent across all analyzed levels (Under-16, Under-18, and Senior). At the Under-18 and Senior levels, these statements may carry either positive or negative connotations, reflecting the demand level and athlete autonomy. In the tactical domain, the most frequently used subcategories were "reactive tactical statements", "proactive tactical statements", and "questioning directed at athletes". Reactive tactical statements, where the coach comments on a tactical action performed by an athlete, often have a negative connotation. However, coaches showed caution in delivering these to avoid demotivating impacts on individual and collective performance.

The psychological dimension exhibited the greatest discursive differences between levels. At the senior level and occasionally in Under-18, disapproval statements directed at specific behaviors or performances were common. In contrast, the Under-16 group predominantly featured general encouragement statements, supporting a more pedagogical and motivational discourse appropriate to the athletes' development phase.

In the "other statements" category, the most frequent considered items were player substitutions and "hustles." The latter refers to specific moments at the end of timeouts when the coach seeks to gather and motivate the team, promoting cohesion and focus to overcome possible negative momentum. Examples of "hustles" included team chants and collective expressions of unity and motivation.

In the content analysis context, and when asked about function and communication strategies used, all interviewed coaches agreed that timeout is a strategic moment to resolve problems identified during the game, propose concrete solutions, or reinforce positive behaviors already shown by the team. Additionally, it is also used to anticipate the opponent's strategies.

Participants unanimously perceived that the language used during the timeout should be simple, clear, and direct, given this moment's inherent time limitation. The importance of avoiding overly technical terms or ambiguous messages that could compromise athlete understanding was also emphasized. Non-verbal communication, including tone of voice, gestural expressiveness, and body posture, was highlighted as an essential complementary factor in effectively transmitting the message. Timeout's speech effectiveness was associated by all interviewees with its capacity to generate immediate instructions' application upon game resumption. Less effective discourse was characterized by lengthy, vague, or disconnected explanations from the specific game context.

When questioned about addressing offensive tactical-technical components during the timeout, the coaches stressed the importance of identifying specific actions against particular defenders or defensive systems. In this context, the timeout serves to reposition athletes, adjust trajectories, and reinforce the timing of collective actions, aiming to make the attack more fluid and unpredictable. From a defensive standpoint, coaches indicated that the focus is on correcting collective errors by presenting effective opponent behaviors to anticipate their finishing possibilities. Emphasis is placed on maintaining tactical discipline and collective effort, highlighting defense as essentially a team endeavor.

Regarding timeout's limited duration (discourse organization), interviewees presented differing perceptions. Two coaches considered this interval insufficient to introduce complex tactical changes, mainly due to athletes' emotional state and reduced cognitive processing capacity under competitive stress. Thus, they support the view that any adjustment should be simple, direct, and previously trained. The others mentioned that, in tactically well-prepared teams, timeouts can be used to activate more elaborate strategic variants, providing effective and objective communication, proposing the following temporal structure for managing the timeout: a) players' bench arrival (5 seconds); b) positive feedback or initial warning (10 seconds); c) main information

transmission (offensive or defensive (15 seconds); d) individualized feedback (5 seconds); e) indication of immediate action to be taken (5 seconds); f) motivational stimulus before returning to the game (between 10 and 20 seconds). All coaches attributed great importance to the use of visual aids, such as tactical boards, during timeouts, especially in competitive pressure contexts. These tools were considered useful for increasing information clarity, allowing immediate positional corrections, and facilitating the communication of tactical alternatives in an accessible manner. The use of statistical data or real-time observations was also valued, enabling a more informed and objective decision-making process by the coach.

Regarding timeouts management throughout the game, the interviewees stated that this resource should be preserved for decisive moments, where technical intervention can be crucial for the match's outcome. In specific situations, it is preferable not to interrupt the game immediately, relying on the team's maturity and self-regulation, particularly when aiming to maintain the emotional flow and competitive rhythm. It was also highlighted that premature use of the timeout may convey messages of insecurity or anxiety, compromising team confidence.

In scenarios where the team holds a lead on the scoreboard, coaches affirmed that the discourse should focus on managing the team's emotions, controlling the game pace, and maintaining concentration. Conversely, in disadvantageous contexts, the discourse should be more interventive and direct, focusing on error correction and implementing immediate solutions. In these cases, the motivational component gains increased importance to reactivate the team's competitive focus.

Finally, when questioned about the differences between the discourse directed at initiation and high-performance teams, the coaches were unanimous in stating that discourse in developmental contexts should be pedagogical, simple, and explanatory, promoting learning and a positive environment. In high-performance settings, where athletes demonstrate greater tactical and emotional maturity, the coach may adopt a more direct language, oriented toward strategic details and occasional psychological interventions. The ability to manage competitive stress and respond to complex instructions is considered a well-established competence in these teams, allowing for more efficient communication focused on optimizing individual and collective performance.

Discussion

This study aimed to investigate the timeout in Handball, identifying the reasons motivating coaches to use it and analyzing the content of their speech during the stoppage. Focusing on the predominance of tactical discourse, the study by Zetou et al. (2008), using the same instrument as the present work, found that approximately 50,85% of timeout comments referred to game tactics. The data we collected is consistent with these results, showing that tactical statements are the most frequent, especially in the subcategories "reactive", "proactive", and "questions directed to athletes".

Considering the timeout's effect depending on the game's moment, Ruano et al. (2011) observed improvements in offensive and defensive performance after timeouts, particularly in the final minutes, as well as variations depending on the score (disadvantage, balance, or advantage). Prudente et al. (2009) further noted that 54,5% of timeouts occur in the last ten minutes of each half. Considering game periods (half parts), Blanco et al. (2012) recorded that 60% of timeouts were requested in the first half and the remaining 40% in the second half. We found that more urgent or interventive speeches occur in disadvantageous situations, and decisive moments in the game reinforce this pattern.

Although there was a temporal plan presented by one of the interviewees (a specific division of time - in seconds - for different types of intervention), this is not frequently documented in the literature, since most studies focus on timeout frequency, overall effects or comment types, thus, such detail may offer an interesting practical contribution to coaches' communication training. Moreover, it is pertinent to recall Cushion et al.'s (2003) opinion that the concept of competition should not be limited solely to the time players are on the court, considering that team dialogs, player-coach interactions, and pause moments such as breaks and timeouts are also part of the competition.

Regarding language importance, the literature recommends avoiding technical information's excess during timeouts, especially under pressure (Apitzsch, 2009; Moesch et al., 2014), favoring clear, objective, and rehearsed communication (Kleinert et al., 2012). This recommendation aims to prevent excessive explanations or the use of highly technical language in pressure situations, since athletes have a reduced capacity to process complex information under stress. Therefore, timeouts are more effective when interventions are direct, well-trained, and rehearsed in advance. For example, Fernández-Echeverría et al. (2019) indicate that timeouts called after short "loss of rallies" are more likely to produce a positive effect, suggesting that quick and focused interventions are more useful.

It was found that, in initiation teams, coaches tend to use a more pedagogical, motivational, and encouraging discourse compared to the more direct, technical, or strategic discourse employed in high-performance contexts, which aligns with findings from studies comparing not only competition levels but also the coach's experience observed during these moments. The study by Saavedra et al. (2012) demonstrates that experience may be related to timeout usage patterns, although not necessarily in a linear or fully predictable way. This study reveals a clear difference between age categories, with more frequent disapproval comments noted in senior teams and encouragement in younger categories. This difference aligns with Guzmán and Calpe-Gómez's

findings (2012), who show that coach intervention's input varies according to its preceding action's nature (positive or negative), suggesting contextual sensitivity in discourse. Although other studies mention motivational or psychological components in timeouts, few detail such a graduated tonal variation (positive vs. negative) as clearly. This may constitute a new contribution, particularly useful for modeling coach training interventions.

The observed results corroborate those by Guzmán and Calpe-Gómez (2012), showing that coaches use different types of interventions depending on the nature of the preceding action (positive or negative), with technical feedback prevailing after negative actions, while encouragement emerges after positive actions. Furthermore, timeouts technical discourse categorization observed in this study (such as tactical instructions, orders, suggestions, feedback, or warnings) aligns with the interventions' taxonomy proposed by these authors. The works of Debanne et al. (2014) and Debanne (2018) also contribute to this analysis by describing a decision hierarchy for coaches, which primarily includes technical corrections and substitutions, resorting to timeouts only as a last resource. This decision structure was confirmed by the present study's interviewees, especially in high-level competitive contexts.

Finally, resembling the general literature that mentions the importance of visual and statistical resources (Cushion et al., 2003), so does our study reveal that coaches significantly appreciate these tools during timeouts, especially under pressure situations. However, the empirical effectiveness of such resources on post-timeout performance still lacks robust confirmation, representing a promising line of research. Nonetheless, the association between calling a timeout and subsequent performance improvement should be interpreted cautiously. Assis et al.'s (2021) study argues that part of these effects may result from statistical phenomena like mean's regression. Consequently, although this study observes improvements in timeouts following moments, it cannot exclude the hypothesis that such variations occur independently of the coach's intervention, reinforcing the need for more rigorous causal analyses.

Conclusions

This study reinforces the need for coaches to receive specific training aimed at optimizing timeout communication, particularly through the use of simple and clear language, efficient time management, prior preparation of tactical alternatives, and the delivery of psychological feedback adjusted to athletes' developmental levels. These findings suggest that timeout's effectiveness is not solely dependent on tactical knowledge, but also on how information is structured, conveyed, and perceived by players under time pressure. Consequently, coach education programs should place greater emphasis on communication competencies, decision-making under constrained temporal conditions, and the integration of psychological regulation strategies within tactical instruction.

From an applied perspective, the results highlight the need to develop and validate assessment instruments capable of adequately evaluating the qualitative and quantitative dimensions of timeout communication. Such tools would allow future research to move beyond descriptive approaches by incorporating statement category frequencies' analyses, as well as the athlete's perceived quality (how clearly they understood, how applicable it was), alongside observable real effects (time elapsed until the next tactical action, corrected errors' quantity, collective and/or immediate performance). The availability of standardized instruments could enhance both research quality and practical feedback provided to coaches.

Therefore, it is also important to reflect in its implications for future research design. More in-depth causal investigations are recommended, combining discourse content analysis with performance metrics and systematically comparing pre- and post-timeout phases. Additionally, controlling contextual variables such as score difference, game period, accumulated fatigue, and competitive pressure would allow for a more precise understanding of the conditions under which timeout communication is most effective. Such methodological advances would contribute to a more robust evidence base regarding the strategic value of timeouts in Handball.

Despite the need for caution in interpreting the findings due to sample size limitations, the observed patterns in coaches' behaviors and communication strategies provide a basis for enhancing coach training programs, practice design, and in-game decision-making processes. Overall, this work underscores the relevance of timeout communication as a modifiable and impactful component of coaching performance, with clear implications for improving both athlete understanding and Handball's competitive outcomes.

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