TECHNICAL-TACTICAL OBJECTIVES BY STAGES FOR PADEL (TTOSP): VALIDATION OF AN INSTRUMENT FOR PADEL COACHES

OBJETIVOS TÉCNICO-TÁCTICOS POR ETAPAS PARA PÁDEL (TTOSP): VALIDACIÓN DE UN INSTRUMENTO PARA ENTRENADORES DE PÁDEL

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Abstract

The purpose of this study was to design and validate an instrument on technical-tactical objectives by stages for padel players. Twelve experts participated in the process and had to meet all the inclusion criteria. Aiken's *V* coefficient and confidence intervals were used to calculate content validity and Cronbach's α coefficient to analyses reliability. The 57 items initially designed were assessed for appropriateness and wording. Three items were modified for obtaining values < .70 in Aiken's *V* coefficient in the adequacy, according to the qualitative assessments of the experts. The rest of the items were considered correct because they obtained values > .79 in Aiken's *V* coefficient for appropriateness and wording. The reliability of the instrument was acceptable (α = .97). The instrument is particularly innovative and valuable for defining technical-tactical objectives for padel players at various stages. Therefore, coaches and federations are urged to consider the Technical-Tactical Objectives by Stages in Padel (TTOSP) tool for coach education and player development.

Keywords: Content validity, reliability, notational analysis, tool, training.

Resumen

El objetivo de este estudio fue diseñar y validar un instrumento sobre objetivos técnico-tácticos por etapas para jugadores de pádel. Participaron 12 expertos que debían cumplir todos los criterios de inclusión. Se utilizó el coeficiente *V* de Aiken y los intervalos de confianza para calcular la validez de contenido y el coeficiente α *de Cronbach* para analizar la fiabilidad. Se evaluó la adecuación y redacción de los 57 ítems diseñados inicialmente. Se modificaron tres ítems por obtener valores < .70 en el coeficiente *V* de Aiken en la adecuación, según las valoraciones cualitativas de los expertos. El resto de los ítems se consideraron correctos por obtener valores > .79 en el coeficiente *V* de Aiken en adecuación y redacción. La fiabilidad del instrumento fue aceptable (α = .97). El instrumento es especialmente innovador y valioso para definir los objetivos técnico-tácticos de los jugadores de pádel en las distintas etapas. Por lo tanto, se insta a entrenadores y federaciones a considerar la herramienta Objetivos Técnico-Tácticos por Etapas en Pádel (TTOSP) para la formación de entrenadores y el desarrollo de jugadores.

Palabras clave: Validez de contenido, fiabilidad, análisis notacional, herramienta, entrenamiento.

Introduction

Padel is a racket sports played in pairs (2 vs 2) into a small-sized grass court (20 x 10 m) surrounded by glass and mesh walls in which the ball can bounce on (Courel-Ibáñez et al., 2019), with a play rule like tennis sport. This sport is one of the fastest growing sports in the world, since it is easy to play and enjoyable for people of all ages, skill and fitness levels from the first day (Courel-Ibáñez et al., 2017; 2018; García-Benítez et al., 2018; Pradas et al., 2021). Currently, more than 80 national federations are affiliated with the International Padel Federation (FIP, 2025). This growth has led to an increase in the number of scientific publications on padel (Martín-Miguel et al., 2023; Sánchez-Alcaraz et al., 2022), especially those related to performance parameters in professional padel. The scientific literature devoted to the study of the game on young padel players is not so extensive. Research related to the temporal structure of the game, the number of shots, or their typology has only been found in a few studies (Carrasco et al., 2011; García-Benítez et al., 2018; Sánchez-Alcaraz, 2014; Sánchez-Pay et al., 2020, 2023).

Technique, defined as the motion activity specified by biomechanical principles of human motion which utilize motor features of movement and body structure to obtain the best sports result (Bober, 1981), serves as a functional component in reaching a tactical aim. On its part, tactics are intricately connected to the decision-making processes of players during

gameplay, which involve evaluating available options along with their respective risks and opportunities (Fuller & Alderson, 1990). In padel, for instance, if the tactical objective is to gain the net position, executing a well-placed deep lob aimed at surpassing the opposing pair can create the necessary opportunity and time to secure position at the net.

Developing expert athletes is a fundamental component of long-term developmental programs, typically initiated during youth categories. Given the crucial role of implementation strategies in refining the decision-making and execution proficiency of youth players, experimental methodologies have explored interventions aiming to foster the ability to comprehend environments and execute a higher rate of successful technical-tactical actions (García-González et al., 2014; Gil-Arias et al., 2019; Panchuk et al., 2018; Práxedes et al., 2018). In this sense, it is noteworthy that adolescence is a critical phase for the maturation of decision-making-dependent skills such as perception, attention, anticipation, and working memory (Albert & Steinberg, 2011; Araújo et al., 2015; Memmert, 2010).

On the other hand, several observational instruments on performance and game analysis have been validated in padel. Several studies have designed and validated observational tools related to game analysis based on the quantitative and qualitative knowledge of expert groups (Conde-Ripoll et al., 2024; Díaz et al., 2021; Escudero-Tena et al., 2022, 2023; Fernández de Ossó & León-Prados, 2017). Specifically, Fernández de Ossó & León-Prados (2017) developed an instrument to analyse some technical-tactical performance indicators in professional and amateur padel players. Escudero-Tena et al. (2022) tried to design and validate a tool to ascertain the characteristics of the shots that padel pairs use to reach the net and their consequences in the two subsequent shots of the game through twelve variables. Escudero-Tena et al. (2023) developed and instrument for the analysis of the performance parameters related to the smash in padel of fourteen variables, and Díaz et al. (2021) aimed to design and validate an instrument that allows analyse how points are concluded in padel. Finally, a recent study designed and validated a guide to strategic principles in padel, offering practical recommendations for players and coaches (Conde-Ripoll et al., 2024).

After reviewing the scientific literature, there is a notable shortage of research covering youth padel, in addition, there is no long-term athlete development program in padel. Therefore, as well as instruments on other topics related to padel performance have been validated. Therefore, the aim of this research was to design and validate an instrument to know the technical-tactical objectives by stages for the development of padel players, through the qualitative and quantitative assessment of expert judges. The authors aspire for this endeavor to serve as a foundational resource for coaches to design and run practice sessions with young padel players, urging future investigations into enhancing the development of junior padel players.

Materials and Methods

Research Design

The design was classified within the instrumental methodology, *ex post facto* (Montero & León, 2007), to develop and validate an instrument to assess the technical-tactical objectives by stages for the development of padel players.

Participants

The participants were chosen deliberately and intentionally, since expert subjects were sought who were capable of transmitting knowledge and information about the object of study, as well as making evaluations which could provoke reflection and help researchers (Escobar & Cuervo, 2008). In addition, an attempt was made to select a group of experts who met the inclusion criteria established by the researchers: (i) possess the level 1 or 2 federative certification in padel, (ii) have experience as a coach of young players, (iii) have experience as a coach of a young player among the top 20 in the provincial ranking of any youth category (iv) have experience as a federated padel player. No one who did not meet these four criteria could be appointed as an expert judge in the investigation. Finally, the sample that participated in the validation of the instrument was made up of 12 experts, who had to meet the four established inclusion criteria.

Study Variables

Variables were identified to analyse the content validity and reliability of the tool. Content validity is defined as the degree to which an item adequately represents the instrument (Thomas et al., 2022). In this study, the technique used to achieve an optimal level of content validity was the assessment based on the criteria of expert judges (Bulger & Housner, 2007). The expert judges assessed the adequacy and wording of each variable on a quantitative scale of 1 to 10. Adequacy is the extent to which an item is considered relevant and should be part of the tool. On the other hand, wording refers to the extent to which an item is correctly written. Similarly, the expert judges made an overall qualitative assessment of each item if they felt it was appropriate, where they expressed their alternative to certain aspects that they would personally improve. Reliability, understood as the internal reproducibility of a measure (Thomas et al., 2022), was measured using *Cronbach's* α coefficient.

Instruments

Table 1

Technical-Tactical Objectives by Stages for the Development of Padel Players

Stage	Technical-tactical objectives
Beginning (4-7 years old)	1. Encourage and develop basic motor skills (running, braking, changing direction, receiving an object (ball), throwing an object (ball), jumping, using both arms and legs to send and receive objects, etc.). 2. Familiarise children with the materials and play space by combining individual and group tasks. 3. Prioritise the child's use of a continental grip. 4. Start playing rallies, cooperative and competitive. The rally can be with the ball rolling, with multiple bounces or just one bounce, with or without net, against the wall, with or without racket...
Development (7-10 years old)	5. Work on simple communication: ask for the ball at the time of hitting and, the player who does not hit, keep his eyes on the opponent's field. 6. Encourage consistency as a basis for being a good player. 7. Understand and identify the three phases of the game (offensive, neutral, defensive). 8. Move as a brick (go up to the net and down to the back at the same time). 9. Know the partner's own space, repositioning oneself according to the stroke executed; and the opponent's space, through the search for zones (moving the opponent). 10. Play on both sides of the court, regardless of the dominant hand. 11. Encourage the formation of the traditional serve. 12. Know and practise the different game situations (serve vs return, baseline vs net, net vs net, transitions...). 13. Become aware of the scoreboard (you can start with a modified scoreboard: 1, 2, 3... and progress towards the regulation scoreboard) and the basic rules of padel. 14. Make contact in front of the body if possible. 15. Handle the simple wall rebound (introduce the turn in both directions). 16. Work on the different parameters of the trajectory: direction, height, depth, speed. In terms of spin, it is advisable to consolidate the flat shot (hitting with a wall, with a bounce and without a wall, volleys, smashes...). 17. Strengthen the continental grip. 18. Improve motor skills (coordination, agility...). 19. Prioritise control over power by means of short strokes. 20. Strengthen the use of the non-dominant arm to maintain stability when hitting.
Under 12 (10-12 years old)	21. Introduce staggered play. 22. Introduce counter-attack (opening angles from the back, *chiquita* and up to volley...). 23. In terms of communication, as well as asking for the ball, start to call the opponent's position in order to adapt the stroke to be executed. 24. Continue working on consistency. 25. Master the phases of the game and act accordingly. For example, defend without taking risks and attack with the aim of making the opponent hit an uncomfortable shot or even to make the point. 26. Dominate the team's own space, repositioning oneself according to the stroke executed; and the opponent's space, through the search for zones (moving the opponent). 27. Master the simple walls and improving the strokes after a double wall. 28. Introduce the slice spin (and also the side spin in the aerial game), and the topspin from the back of the court. 29. Play on both sides of the court, regardless of the dominant hand. 30. Introduce the Australian serve formation. 31. Master the continental grip and introducing grip changes according to the demands of the game.
Under 14 (12-14 years old)	32. Handle counter-attack situations (*chiquita* and advance to the net, high lob and go up to block...). 33. Detect strengths and weaknesses in the opponent's team. 34. Explore to solve situations in front of different opponents. 35. Manage the change of pace (time management, when to play fast or slow...). 36. Develop a pattern of play according to the characteristics of the player. 37. To consolidate and master the Australian serve formation. 38. Continue to play on both sides of the court and begin to specialise on one side of the court. 39. Manage spin shots (introduce topspin smash). 40. Strengthen the aerial game (*bandeja*, *gancho*, *vibora*, *rulo* to the side wall/fence, power smash, smash over the side fence...). 41. In addition to the continental grip, begin to handle other grips with ease depending on the demands of the game. 42. Encourage fluid communication with the partner in any situation. 43. In a service situation, try to hold the net. In a return situation, try to win the net when the opportunity arises.

Under 16 (14-16 years old)	44. Master the effects. 45. Master all types of grips. 46. Encourage reading and anticipating the opponents' game. 47. Improve the ability to defend and neutralise when opponents are dominating. 48. Take advantage of the opportunities created to try to close plays. 49. Acquire a range of resources to counteract opponents' strengths. 50. Adapt the pattern of play depending on the environment (partner, opponents, temperature, humidity, court, balls...). 51. Master the aerial game (*bandeja*, *gancho*, *vibora*, *rulo* to the side wall/fence, power smash, smash over the side fence...).
Under 18 (16-18 years old)	52. Minimise unforced errors by adjusting strokes to tactical needs. 53. Improve the accuracy of strokes, ensuring that each stroke has a clear tactical intention with the aim of gaining the greatest possible advantage. 54. Improve the ability to evaluate oneself in both technical and tactical terms. 55. Encourage the ability to analyse the opponent. 56. Encourage specialisation on one side of the court. 57. Encourage power as a tactical weapon.

Procedure

After a literature review, the problem statement was identified, and an instrument was built that would consider the technical-tactical objectives by stages for the development of padel players. The first version of the TTOSP was designed by a team consisting of four expert researchers. The expert researchers individually compiled a set of technical-tactical objectives by stages for the development of padel players. They then pooled them and reached a consensus. Once the first version of the TTOSP was defined, the researchers deliberately and purposefully selected a group of expert judges who met the established inclusion criteria. The experts were asked to assess the appropriateness of the technical-tactical objectives by stages for the development of padel players. Additionally, they provided feedback on the wording of the objectives to ensure clarity, precision, and practical applicability for both players and coaches. Upon the response of the experts, the data were recorded in an excel sheet. Quantitative data were used to calculate content validity through Aiken's *V* coefficient and confidence intervals and reliability from Cronbach's α coefficient. Qualitative data were used to improve the final writing of the instrument.

Statistical Analysis

Content validity was calculated using Aiken's *V* coefficient (Aiken, 1985), which is used to quantify the relevance of an item to a group of experts. Its value ranges between .00 and 1.00, where the latter indicates perfect agreement between the judges with respect to the content evaluated. For its calculation, the Visual Basic 6.0 software developed by Merino and Livia (2009) was used, which employs the formula modified by Penfield and Giacobbi (2004), where $\bar{X}$ refers to the mean of the scores obtained by the judges, ι is the lowest value of the scale (1) and *K* is its range (10-1 = 9).

$$V = \frac{\bar{X} - \iota}{K}$$

In addition, this application allows confidence intervals to be obtained at the 90%, 95% and 99% levels using the score method (Penfield & Giacobbi, 2004). This calculation of confidence intervals is a confirmatory test that demonstrates greater goodness of fit for the creation of instruments designed for the first time (Merino & Livia, 2009).

To establish the criteria for elimination, modification or acceptance of items, the initial formula proposed by Aiken (1985) was followed, applying the central limit theorem. In his proposed calculation, *z* = significant value of content validity; *m* = number of variables; *n* = number of experts and *c* = range of the scale.

$$V = \frac{z}{0.2\sqrt{\frac{3mn(c-1)}{(c+1)}}} + 0.5$$

The approach used by other researchers when validating instruments was followed, using the cut-off point to eliminate an item at 95% confidence. When the values were between 95% and 99% confidence, the items should be improved. An

item is considered to be correctly designed when it has a value above 99% confidence (García-Ceberino et al., 2020; Ibáñez et al., 2019). This is a very demanding criterion for the validation of a tool. Therefore, in the present research, variables with mean values below < .70 in Aiken's *V* (below 95% confidence) were eliminated, items with mean values between .70 and < .79 (between 95% and 99% confidence) were modified, and items with mean values ≥ .79 (above 99% confidence) were considered correct (Table 2).

Table 2
Criteria to be Followed for Acceptance, Modification or Deletion of Variables

		Wording		
		≥ .79	[.70 - < .79]	< .70
Adequacy	≥ .79	Correct	The wording is amended	The wording is amended
	[.70 - < .79]	Adequacy is amended	Adaptation and wording are amended	Adaptation and wording are amended
	< .70	The item is deleted	The item is deleted	The item is deleted

Cronbach's α coefficient (Cronbach 1990), was used to analyse the reliability of the instrument. This coefficient is used to check whether the instrument being evaluated collects faulty information and would therefore lead to wrong conclusions or, on the other hand, whether it is a reliable instrument that makes stable and consistent measurements. Thus, Field (2009) shows that an acceptable reliability is considered to be .70 and above. Statistical analysis was performed with SPSS v.21 software (IBM Corp. 2012. IBM SPSS Statistics for Windows, NY: IBM Corp).

Results

Table 3 shows the results obtained for each of the items of the instrument in terms of adequacy. It is observed that except for items 11, 28 and 38, all exceed the acceptance value for Aiken's *V* with respect to the adequacy, which was set at .79. Therefore, items 11, 28 and 38 (11 and 28 (Aiken's *V* = .77) and 38 (Aiken's V = .78)) will be modified.

Table 3
Mean, Standard Deviation, Aiken's V Coefficient and Confidence Intervals Results (Adequacy)

item	*M*(*SD*)	*V*	90% *CI*		95% *CI*		99% *CI*	
			Low.	Upp.	Low.	Upp.	Low.	Upp.
1	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
2	9.58(0.79)	.95	.90	.97	.89	.97	.87	.98
3	8.33(1.87)	.81	.75	.87	.73	.88	.70	.89
4	9.18(1.40)	.91	.85	.94	.84	.95	.81	.96
5	9.00(0.95)	.89	.83	.93	.82	.94	.79	.94
6	9.25(1.22)	.92	.86	.95	.85	.96	.82	.96
7	9.17(1.03)	.91	.85	.94	.84	.95	.81	.96
8	9.00(1.48)	.89	.83	.93	.82	.94	.79	.94
9	8.83(1.03)	.87	.81	.91	.79	.92	.77	.93
10	9.25(1.54)	.92	.86	.95	.85	.96	.82	.96
11	7.92(2.64)	.77	.70	.83	.68	.84	.65	.86
12	9.33(1.23)	.93	.87	.96	.86	.96	.83	.97
13	8.92(1.38)	.88	.82	.92	.81	.93	.78	.94
14	8.83(1.70)	.87	.81	.91	.79	.92	.77	.93
15	8.92(1.08)	.88	.82	.92	.81	.93	.78	.94
16	8.92(1.73)	.88	.82	.92	.81	.93	.78	.94
17	9.08(1.62)	.90	.84	.94	.83	.94	.80	.95
18	9.17(1.19)	.91	.85	.94	.84	.95	.81	.96
19	9.25(1.36)	.92	.86	.95	.85	.96	.82	.96

20	9.42(0.79)	.94	.89	.96	.87	.97	.85	.97
21	8.33(1.61)	.81	.75	.87	.73	.88	.70	.89
22	8.42(1.24)	.82	.76	.88	.74	.88	.71	.90
23	9.58(0.79)	.95	.90	.97	.89	.97	.87	.98
24	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
25	9.36(1.21)	.93	.88	.96	.86	.96	.84	.97
26	9.25(1.36)	.92	.86	.95	.85	.96	.82	.96
27	9.42(0.90)	.94	.89	.96	.87	.97	.85	.97
28	7.91(1.81)	.77	.70	.83	.68	.84	.65	.85
29	8.75(1.71)	.86	.80	.91	.78	.91	.76	.93
30	8.50(1.51)	.83	.97	1.00	.96	1.00	1.00	1.00
31	8.25(1.71)	.81	.74	.86	.72	.87	.69	.88
32	9.33(0.78)	.93	.87	.96	.86	.96	.83	.97
33	9.00(1.60)	.89	.83	.93	.82	.94	.79	.94
34	8.92(1.62)	.88	.82	.92	.81	.93	.78	.94
35	9.08(1.44)	.90	.84	.94	.83	.94	.80	.95
36	8.17(1.95)	.80	.73	.85	.71	.86	.68	.88
37	8.58(1.62)	.84	.78	.89	.76	.90	.73	.91
38	8.00(1.65)	.78	.71	.84	.69	.85	.66	.86
39	9.18(0.98)	.91	.85	.94	.84	.95	.81	.96
40	8.92(1.16)	.88	.82	.92	.81	.93	.78	.94
41	9.08(0.90)	.90	.84	.94	.83	.94	.80	.95
42	8.75(2.18)	.86	.80	.91	.78	.91	.76	.93
43	8.91(1.22)	.88	.82	.92	.80	.93	.78	.94
44	9.00(1.35)	.89	.83	.93	.82	.94	.79	.94
45	9.08(1.38)	.90	.84	.94	.83	.94	.80	.95
46	9.33(1.07)	.93	.87	.96	.86	.96	.83	.97
47	9.08(1.56)	.90	.84	.94	.83	.94	.80	.95
48	9.08(1.24)	.90	.84	.94	.83	.94	.80	.95
49	8.75(1.60)	.86	.80	.91	.78	.91	.76	.93
50	8.67(2.61)	.85	.79	.90	.77	.91	.75	.92
51	9.75(0.62)	.97	.93	.99	.92	.99	.90	.99
52	9.00(2.59)	.89	.83	.93	.82	.94	.79	.94
53	9.67(0.89)	.96	.92	.98	.91	.99	.89	.99
54	9.33(0.89)	.93	.87	.96	.86	.96	.83	.97
55	9.67(0.78)	.96	.92	.98	.91	.99	.89	.99
56	9.25(0.97)	.92	.86	.95	.85	.96	.82	.96
57	8.42(2.07)	.82	.76	.88	.74	.88	.71	.90

Note. *M* = Mean; *SD* = Standard deviation; *V* = Aiken V-coefficient; *CI* = Confidence interval; Low. = Lower limit; Upp. = Upper limit

Table 4 shows the results obtained for each of the items of the instrument in terms of wording. It is observed that all exceed the acceptance value for Aiken's *V* with respect to the wording, which was set at .79.

Table 4
Mean, Standard Deviation, Aiken's V Coefficient and Confidence Intervals Results (Wording)

item	*M*(*SD*)	*V*	90% *CI*		95% *CI*		99% *CI*	
			Low.	Upp.	Low.	Upp.	Low.	Upp.
1	9.58(0.67)	.95	.90	.97	.89	.97	.87	.98
2	9.75(0.62)	.97	.93	.99	.92	.99	.90	.99
3	9.58(0.90)	.95	.90	.97	.89	.97	.87	.98
4	9.55(0.93)	.95	.90	.97	.89	.98	.87	.98
5	9.25(0.97)	.92	.86	.95	.85	.96	.82	.96
6	9.67(0.89)	.96	.92	.98	.91	.99	.89	.99
7	9.33(0.89)	.93	.87	.96	.86	.96	.83	.97
8	9.67(0.78)	.96	.92	.98	.91	.99	.89	.99
9	9.42(0.90)	.94	.89	.96	.87	.97	.85	.97
10	9.42(1.00)	.94	.89	.96	.87	.97	.85	.97
11	8.75(1.76)	.86	.80	.91	.78	.91	.76	.93
12	9.75(0.45)	.97	.93	.99	.92	.99	.90	.99
13	9.75(0.62)	.97	.93	.99	.92	.99	.90	.99
14	9.58(1.00)	.95	.91	.98	.90	.98	.87	.98
15	8.92(1.44)	.88	.82	.92	.81	.93	.78	.94
16	9.75(0.62)	.97	.93	.99	.92	.99	.90	.99
17	9.42(1.44)	.94	.89	.96	.87	.97	.85	.97
18	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
19	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
20	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
21	8.92(1.24)	.88	.82	.92	.81	.93	.78	.94
22	9.33(0.89)	.93	.87	.96	.86	.96	.83	.97
23	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
24	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
25	9.64(0.81)	.96	.92	.98	.90	.98	.88	.99
26	9.58(0.79)	.95	.90	.97	.89	.97	.87	.98
27	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
28	8.91(1.58)	.88	.82	.92	.80	.93	.78	.94
29	9.50(1.00)	.94	.90	.97	.88	.97	.86	.98
30	8.92(1.56)	.88	.82	.92	.81	.93	.78	.94
31	9.17(1.59)	.91	.85	.94	.84	.95	.81	.96
32	9.67(0.65)	.96	.92	.98	.91	.99	.89	.99
33	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
34	9.50(0.90)	.94	.90	.97	.88	.97	.86	.98
35	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
36	8.92(1.44)	.88	.82	.92	.81	.93	.78	.94
37	9.67(0.65)	.96	.92	.98	.91	.99	.89	.99
38	9.00(1.91)	.89	.83	.93	.82	.94	.79	.94
39	9.55(0.82)	.95	.90	.97	.89	.98	.87	.98
40	9.58(0.90)	.95	.90	.97	.89	.97	.87	.98
41	9.50(0.80)	.94	.90	.97	.88	.97	.86	.98
42	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
43	9.91(0.30)	.99	.96	1.00	.95	1.00	.93	1.00
44	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00

45	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
46	9.75(0.62)	.97	.93	.99	.92	.99	.90	.99
47	9.83(0.39)	.98	.95	.99	.93	.99	.91	1.00
48	9.58(0.79)	.95	.90	.97	.89	.97	.87	.98
49	9.67(0.65)	.96	.92	.98	.91	.99	.89	.99
50	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
51	9.50(1.45)	.94	.90	.97	.88	.97	.86	.98
52	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
53	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
54	9.25(1.14)	.92	.86	.95	.85	.96	.82	.96
55	9.92(0.29)	.99	.96	1.00	.95	1.00	.93	1.00
56	9.50(1.00)	.94	.90	.97	.88	.97	.86	.98
57	9.17(1.53)	.91	.85	.94	.84	.95	.81	.96

Note. *M* = Mean; *SD* = Standard deviation; *V* = Aiken V-coefficient; *CI* = Confidence interval; Low. = Lower limit; Upp. = Upper limit

Table 5 shows, by way of example, the qualitative assessments provided by the expert judges, as well as the actions that have been taken as a result.

Table 5
Qualitative Evaluations by Experts

Item	Nº of contributions	Example	Action
11	9	- In this way everyone can see the court from both sides and know the pros and cons through lived experiences. - It should not always be traditional formation. - At this stage, the serve is a rather unrealistic aspect, as it sometimes rents too much. I prefer that the detailed formation of the serve is done at a later stage. - This way we will encourage play on both sides of the court and it will be easier to cover the net after the serve. - Both forms should be taught, but at an early age it is better to teach the traditional serve formation so that they continue along the lines of the previous point, playing on both sides of the court. In any case, the different serve formations should be known in case they can be useful. - Explain the two systems that exist and explain the whys and wherefores and start with the traditional system so that they become familiar with both sides of the court. - They can get a better understanding of the game and they don't have to specialise on one side, it also helps to cover the spaces better on the first shot after the serve.	- Before: Encourage the formation of the traditional serve. - After: Encourage the formation of the traditional serve to promote play on both sides. Also, explain the two systems that exist (traditional and australian).
28	9	- I would always write it down by first indicating the flat stroke, establishing the touch on the ball, when we introduce the spin, I would always name them as flat-slice or flat-topspin. - The flat stroke must be very well established. - This is the ideal stage for learning these spin shots. - At this stage I prefer to fix only the slice and neutral spin. - I would not use the topspin yet. - A mere or cursory introduction. I would continue to consolidate the flat spin. - I would give importance to the slice, but I would not put so much emphasis on the topspin. - I would work on strengthening the forehand and backhand grips. - It will help to have more variety and to be able to use the tactic better, as well as making the opponent more uncomfortable, especially with the slice effect in the no bounce shot and the side effect in the aerial game.	- Before: Introduce the slice spin (and also the side spin in the aerial game), and the topspin from the back of the court. - After: Introduce the slice spin (and also the side spin in the aerial game) in both the baseline and net game. Also introduce topspin from the back of the court. Bear in mind that the flat spin must be established beforehand.

38	9	- At competition level it would strengthen the specialization of one side and detect the role of each player. - It is too early to specialize. - Play on the most productive side according to the characteristics of the player's game, but also play on the other side. - I am in favour of learning (how to play) in both positions, unless the player's characteristics are very clear. - Players should start to choose a preferred playing side, but without giving up playing on both sides, which will give them the option to play with a greater number of players throughout their sporting career. - I don't see it either. - Despite starting with it, I am still in favour of playing on both sides of the court. - It is good to train on both sides and perhaps compete on the side of the game that corresponds to the player's current characteristics. - Start specialising on one side of the court to consolidate your strokes and polish your technique on that side of the court, but without giving up playing on both sides.	- Before: Continue to play on both sides of the court and begin to specialise on one side of the court. - After: Continue to play on both sides of the court and, taking into account the player's characteristics, start specialising on one of them.

Finally, Table 6 collects the values obtained in the reliability of the tool with Cronbach's *α* coefficient.

Table 6
Reliability Analysis of the Instrument

	Adequacy	Wording	Total
	.77	.84	.97
Valid	57	57	114

Discussion

The purpose was to design and validate an instrument for the technical-tactical objectives by stages for the development of padel players with guarantees of validity and reliability. A tool with 57 items has been generated, which can be used and followed by padel coaches for the development of their players. Likewise, federations can take it into account in their training programmes. Specifically, this tool is made up of six stages: beginning (4-7 years), with four items or technical-tactical objectives; development (7-10 years), 16 items; under-12 (10-12 years), 11 items; under-14 (12-14 years), 12 items; under-16 (14-16 years), eight items; under-18 (16-18 years), six items. There is little research that has validated and designed instruments in padel (Díaz, Muñoz et al., 2021; Escudero-Tena et al., 2022; 2023; Fernández de Ossó & León, 2017). These investigations are on observational tools that deal with technical-tactical evaluation (Fernández de Ossó & León, 2017), with finishing actions (Díaz et al., 2021), with the different strokes used by padel couples to reach the net and their consequences on subsequent strokes (net approach in padel observational analysis [NAPOA]) (Escudero-Tena et al., 2022), and with the smash (Observational analysis of the smash in padel [OASP]) (Escudero-Tena et al., 2023). Hence, this is a pioneering tool in defining technical-tactical objectives for the development of young padel players.

Bulger and Housner (2007) and Dunn et al. (1999) establish a series of basic criteria for the successful validation of an instrument: (i) the criteria for selecting expert judges; (ii) the number of judges comprising the expert panel; (iii) the procedure used by the judges to assess content validity; (iv) the statistical or quantitative procedures for evaluating the judges' scores; and (v) the selection criteria used to determine whether items are retained, modified or deleted from the final proposal of items to be included in the instrument. In the discussion of the results, these five criteria will be followed and the results of the internal consistency of the instrument will be confronted.

The selection criteria of the group of experts have been rigorously defined for this study. All the judges have a level 1 or level 2 federative coaching certification in padel, ensuring their training. Additionally, having experience as a coach of young players, particularly those ranked in the top 20 of any youth category (e.g., U-12 or U-14), is among the established inclusion criteria that all the expert judges meet. This highlights their specificity and suitability for this study. Criteria similar to those used in this research have been used by other researchers for the validation of their tools (Díaz et al., 2021; García-Ceberino et al., 2020; Ibáñez et al., 2019). In these investigations, the inclusion criteria of meeting 80% or more of the inclusion criteria/factors to be part of the expert judges has been used. However, in the present research, the judges had to meet all the inclusion factors defined by the authors of the study. Thus, the quality of the expert judges participating in the study ensures that the opinions expressed are of sufficient rigour and quality for the final validity of

the tool. On top of this, it is worth highlighting that each of the twelve experts has been part of the coaching staff for a different youth regional team participating in the Youth Spanish Padel Championship by Regions. A total of 17 regions participated in the 2023 edition.

Bulger and Housner (2007) and Dunn et al. (1999) reflect on the number of components that make up the expert group. Several sport-specific studies show that ten or more subjects provide an acceptable estimate for the content validity of a validation instrument (Gómez et al., 2014; Villarejo et al., 2014). The present research meets this requirement, as it has the assessment of twelve experts. Therefore, the contributions of these expert judges are sufficient in quantity and quality for the validation of this tool.

The expert judges carried out a quantitative and a qualitative assessment of each of the items to define the technical-tactical objectives by stages for the development of padel players, a procedure similar to those carried out in other studies (Díaz et al., 2021; Escudero-Tena et al., 2023; García-Ceberino et al., 2020). The quantitative scores of the expert judges were made on a scale of 1 to 10 to assess the wording and appropriateness of the items (Escudero-Tena et al., 2023; Díaz et al., 2021; García-Ceberino, et al., 2020); other works have proposed a smaller rating scale (Collet et al., 2018). Broad rating scales allow expert judges to discriminate about the appropriateness of an item.

For the statistical or quantitative procedures, a very demanding criterion used by other researchers for the assessment of the content validity of a tool was followed (Díaz et al., 2021; García-Martín et al., 2016; García-Santos & Ibáñez, 2016). Using the cut-off point to eliminate an item at 95% confidence, no item was eliminated. For all of them reach values above .70 on the Aiken *V* coefficient of adequacy. The expert judges considered that all items should be part of the construct of technical-tactical objectives by stages for the development of padel players.

When the values were between 95% and 99% confidence the items were improved. Therefore, three items were modified, as they obtained values between .70 and < .79 in Aiken's *V* coefficient on adequacy. Specifically, the following items were modified: 11: encouraging traditional serve formation, 28: introducing the slice spin (and also the side spin in the aerial game), and the topspin from the back of the court and 38: continue playing on both sides of the court and start specialising in one of them. For its modification, the qualitative assessments of the experts were taken into account, which are indispensable for the final elaboration of the instrument (Bulger & Housner, 2007; Carretero & Pérez, 2007). Item 11: "Encourage the formation of the traditional serve" was changed to "Encourage the formation of the traditional serve to promote play on both sides. Also, explain the two systems that exist (traditional and australian)". Item 28: "Introduce the slice spin (and also the side spin in the aerial game), and the topspin from the back of the court" was changed to "the slice spin (and also the side spin in the aerial game) in both the baseline and net game. Also introduce topspin from the back of the court. Bear in mind that the flat spin must be established beforehand". Item 38: "Continue to play on both sides of the court and begin the specialise on one side of the court" was changed to "Continue to play on both sides of the court and, taking into account the player's characteristics, start specialising on one of them".

Finally, an item is considered to be correctly designed when it has a value greater than 99% confidence (García-Ceberino et al., 2020; Ibáñez et al., 2019), that is, when the Aiken *V* coefficient is ≥ .79. Thus, the rest of the items were considered correct, which indicates that the initial design of the tool had a great respect for the criteria defined by the experts for the definition of items.

The results obtained show that the tool is reliable, reaching values higher than those set as a reference by experts (Gliem & Gliem, 2003; Polit & Hungler, 2000). Studies that validate tools for the analysis of sport (Díaz et al., 2021; Escudero-Tena et al., 2022; Gamonales et al., 2018), referees (García-Santos & Ibáñez, 2016) or for the training of athletes (Collet et al., 2018) also reach optimal reliability values using the same procedure as in this research. Therefore, this instrument is considered to be reliable, i.e., it has sufficient internal consistency, ensuring that the items measure the constructs of the technical-tactical objectives by stages for the development of padel players in a consistent manner.

Future tools should focus on the beginning of the points, specifically in serve, serve-return and tactical disposition at serve. These parameters could be very important to get success in padel, because of the advantage of serve (Sánchez-Alcaraz et al., 2020). Likewise, it would be convenient to validate a tool dedicated to the study of the last shot in padel, including variables such as the typology of the shot (volleys, backhand, forehand, backhand) or its effectiveness (winning shot and forced or unforced error).

Conclusions

Once the relevant modifications advised by the group of experts had been made to items 11, 28 and 38, a new proposal for the instrument was drawn up (ANNEX 1). This was made up of 57 items divided into six stages: beginning (4-7 years) with four items or technical-tactical objectives, development (7-10 years) 16 items, under-12 (10-12 years) 11 items, under-14 (12-14 years) 12 items, under-16 (14-16 years) eight items, under-18 (16-18 years) six items. Thus, the inclusion

of all these items makes the tool TTOSP a complete, reliable and valid instrument that can be used by padel coaches and federations.

Ethics Committee Statement

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee: University of Extremadura (157/2022, 10/10/2022).

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

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Authors' Contribution

Conceptualization E.-T. A. & C.-R. R.; Methodology E.-T. A. & C.-R. R.; Software E.-T. A. & C.-R. R.; Validation E.-T. A. & C.-R. R.; Formal Analysis E.-T. A. & C.-R. R.; Investigation E.-T. A. & C.-R. R.; Resources D. M., S.-A. B. J. & C.-R. R.; Data Curation E.-T. A.; Writing – Original Draft E.-T. A. & C.-R. R.; Writing – Review & Editing M. D. & S.-A. B. J; Visualization M. D. & S.-A. B. J.; Supervision M. D. & S.-A. B. J; Project Administration E.-T. A.; Funding Acquisition E.-T. A., M. D., S.-A. B. J & C.-R. R. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author.

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