



Research Article

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Kinesthesia in Equestrianism

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Abstract

Equestrianism is one of the most complex sports disciplines, in which the rider's kinesthesia and "feel" for the horse are just as important as sensing an opponent in combat sports. In this context, the concept of kinesthesia is multifaceted, interdisciplinary, and specific. Consequently, it is difficult to define. Broadly speaking, it depends on the emotional arousal and athletic proficiency of the horse-and-rider pair; their competitive drive ("heart"), the horse's psychomotor capabilities, the quality of training, the trainer's qualifications, the ability to modulate muscle tone, the rider's spatiotemporal orientation, and experience gained from training other horses.

Aim of the Study: The aim of the study was to demonstrate the existence and significance of kinesthesia in equestrian sports.

Materials and Methods: Surveys were conducted among female and male riders during the Cavaliada event in Poznań in 2023 and 2024, involving participants from equestrian centers in Poznań, Bobolin, Szczecin, Wąwolnica, Rydułtowy, Gniezno, and the "Ostoja" center in Chobienice. The respondents ranged in age from 20 to 60 years, in body mass from 44 to 85 kg, and in height from 155 to 185 cm. Show jumping was the primary equestrian discipline for 80% of the respondents, followed by recreational riding (4.28%), eventing (10%), reining (2.85%), and teaming (2.85%). All respondents had between 5 and 38 years of training experience.

Conclusions

- The results obtained from female and male riders representing different equestrian disciplines indicate that, despite the considerable complexity of the issue of rider kinesthesia, this phenomenon has been better understood through the present study.
- Female and male riders are aware of the importance of the factors underlying the rider's feel for the horse.
- The respondents recognize the need for and are familiar with methods of improving the feel for the horse, while at the same time rejecting its association with general motor abilities.
- Despite their practical knowledge, there is a need for comprehensive education on the principles of both fundamental and complementary sports training, including elements of kinesthesia in equestrian sports.

Keywords: Kinesthesia, Primary and supplementary training

Introduction

Julius Caesar Scaliger published the first article concerning movement in space and the sense of body position in 1557. Charles

Bell published a subsequent paper in 1826, and in 1880 Henry Charlton Bastian introduced the term kinesthesian in his work. However, Charles Scott Sherrington is widely regarded as the pioneer



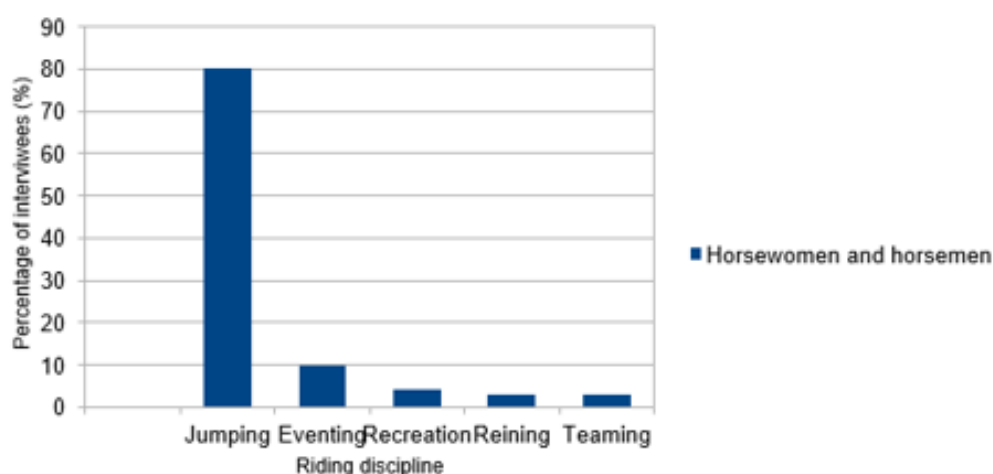
of the scientific interpretation of proprioception [1]. Kinesthetic sensations originate in proprioceptors located within the sensory endings of muscles, tendons, ligaments, and the articular surfaces of bones. Accordingly, proprioceptors are classified into joint receptors, ligament receptors, tendon receptors, and muscle spindle receptors [2]. Kinesthesia therefore encompasses the functional performance of all sensory analyzers, whereas proprioception refers specifically to the function of proprioceptive receptors [3]. Consequently, body awareness constitutes the basis for rational motor behavior during complex motor tasks, enabling optimal movement execution in terms of both form and function. It also represents the resultant response to environmental stressors [4]. The author considers motor coordination, spatial-temporal accuracy and broadly understood motor abilities to be the principal determinants of body awareness in both female and male equestrian riders [3]. Starosta proposed a conceptual classification of body awareness into global, local, global-local, and spatial-temporal categories. He further argued that the foundation of movement awareness is the comprehensive efficiency of the motor analyzers, resulting from the integrated and harmonious functioning of proprioceptors, exteroceptors, and telereceptors. Thus, movement awareness consists of both motor competence and body awareness.

According to this concept, appropriate movement awareness cannot exist without body awareness [4]. Equestrian sport is one of the most complex athletic disciplines, in which the kinesthesia of the rider and the rider's feel for the horse are as important as an athlete's feel for an opponent in combat sports. In this context, kinesthesia is a multidimensional, interdisciplinary, and highly specific concept, making it particularly difficult to define. Broadly speaking, it depends on the emotional arousal and athletic performance of the horse-and-rider pair, competitive motivation, the horse's psychomotor abilities, the quality of training, the coach's qualifications,

the rider's ability to modulate muscle tone, spatial-temporal orientation, and experience gained through training different horses. The complexity of equestrian sport is determined not only by the number of skills that must be mastered but, above all, by their coordinative complexity. In this regard, Starosta emphasized that the classification of sports movements should be based not only on spatial precision but also on temporal and force precision [5]. The aim of the study was to demonstrate the existence and significance of kinesthesia in equestrian sports.

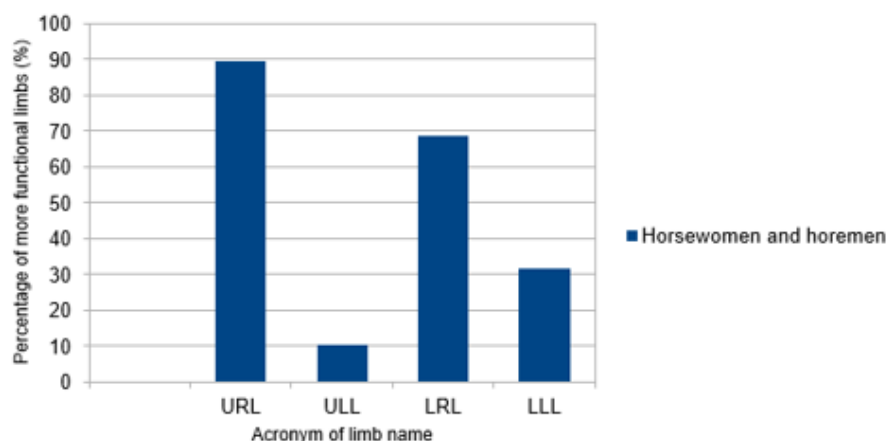
Participants, Methods, and Subject of the Study

A questionnaire survey was conducted among female and male equestrian riders during the Cavaliada events held in Poznań in 2023 and 2024, as well as at equestrian centers located in Poznań, Bobolin, Szczecin, Wąwolnica, Rydułtowy, Gniezno, and Chobienice ("Ostoja"). The participants were between 20 and 60 years of age. Their body weight ranged from 44 to 85 kg, and their body height ranged from 155 to 185 cm. For 80% of the respondents, show jumping was the primary equestrian discipline, while 4.28% participated primarily in recreational riding, 10% in eventing (WKKW), 2.85% in reining, and 2.85% in teaming (Figure 1). All participants had between 5 and 38 years of training experience and reported performing between one and six primary training sessions per day. Among all respondents, 89.58% declared the right upper limb as their dominant upper limb, while 10.42% declared the left upper limb as dominant. Regarding the lower limbs, 68.58% identified the right lower limb as dominant, whereas 31.42% indicated the left lower limb (Figure 2). Furthermore, 87.71% of the respondents reported the right upper limb as the more precise limb, compared with 12.29% for the left upper limb. In the case of the lower limbs, the right lower limb was considered more precise by 82.86% of participants, while 17.14% indicated the left lower limb (Figure 3) (Figure 1,2,3).



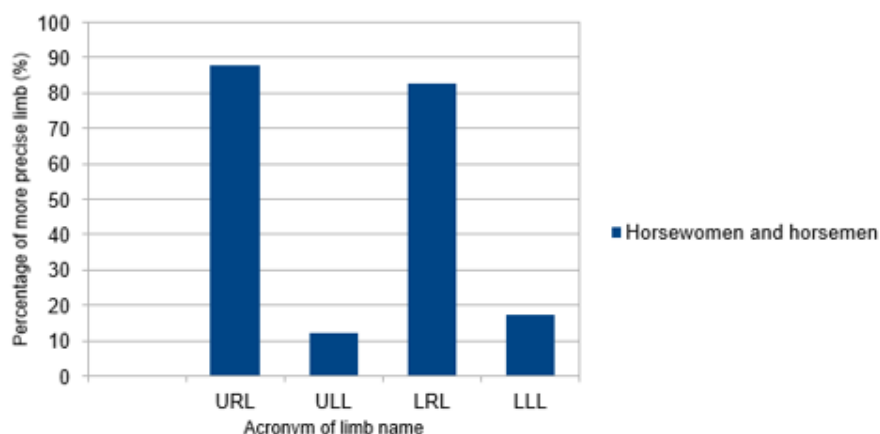
Note*: The legend: A – Show jumping (80%); B – Eventing (10%); C – Recreational riding (4.28%); D – Reining (2.85%); E – Teaming (2.85%).

Figure 1: Leading equestrian discipline (n) 70.



Note*: The legend: URL – upper right limb, ULL –upper left limb, LRL– lower right limb
LLL– lower left limb

Figure 2: More functional limb (n) 70.



Note*: The legend: URL – upper right limb, ULL –upper left limb, LRL– lower right limb
LLL– lower left limb

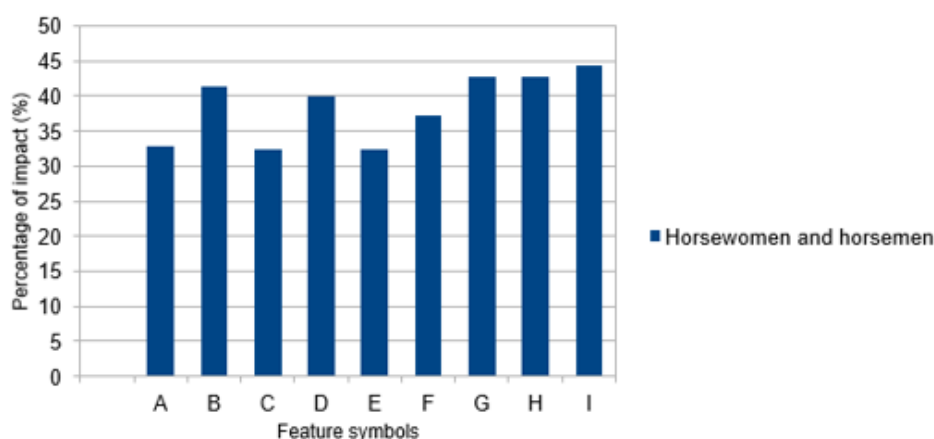
Figure 3: More precise limb (n) 70.

The survey, conducted under the auspices of the International Association of Motor Skills (affiliated with the Institute of Sport – National Research Institute in Warsaw), was developed by Prof. Włodzimierz Starosta and Dr. Mirosław Mrozkowiak. The subject matter and content of the questions were consulted with the national team coach for eventing and dressage. The introductory section of the survey comprised 11 questions regarding gender, age, body mass and height, primary equestrian discipline, training experience, daily training frequency, and the efficiency and precision of limb movements in both rider and horse. The main section consisted of 42 questions concerning the definition of kinesthesia in rider and horse, the conditions for its improvement and decline, and its broad associations with movement characteristics, equestrian equipment, external conditions, gender, age, and the horse's genetic predispositions. Seventy thoroughly and reliably completed

questionnaires—35 from female riders and 35 from male riders—were selected for statistical analysis. The research results were processed using a basic statistical method—calculating the percentage of responses to each question—allowing them to be presented in Figures 4 through 32 for reliable and clear interpretation.

Results Obtained

Among all the subjects, 44.25% most frequently identified the riding posture with the synchronization of body movement with the horse's movement; 42.82% with control of the center of gravity and all movements enabling optimal horse handling; 41.42% with correct body alignment (shoulders, pelvis, and limbs); 40% with a relaxed musculature; 37.14% with optimal weight distribution and body stability; and 32.42% with awareness of the skeletal system and a relaxed posture in the saddle (Figure 4).



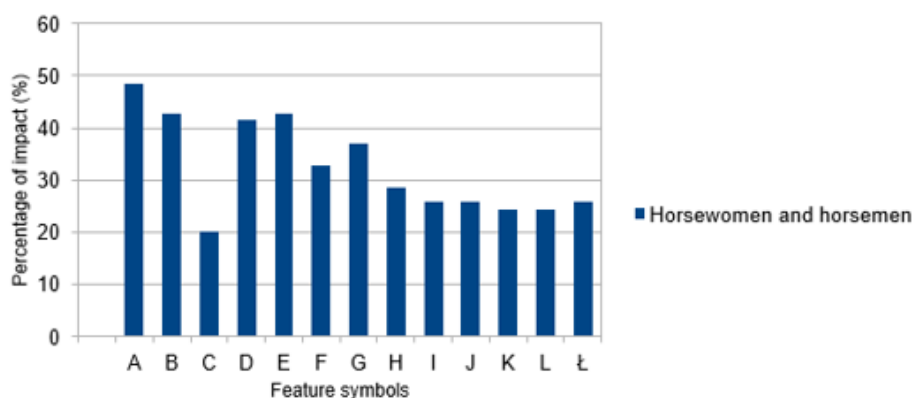
Note*: The legend

A – Stability, B – Awareness of correct body part alignment, C – Relaxed posture, D – Relaxed musculature, E – Awareness of the skeletal system, F – Optimal body weight distribution, G – Control of the center of gravity, H – Control of movements, I – Synchronization of body mass and posture with the horse's movement.

Figure 4: How do the listed characteristics affect the rider's posture? ? (n) 70.

Regarding the traits that should characterize a rider who has a “feel for the horse,” 48.57% cited the ability to read the horse's movements; 45.71% mentioned a sense of distance; 42.85% pointed to making quick decisions to correct anticipated incorrect movements and innate aptitude; 41.42% highlighted sensing every movement of the horse and proprioception (muscle sense); 32.85%

noted the level of motor coordination; 28.57% cited advanced technical training; 25.71% mentioned mental resilience, the ability to tense and relax specific muscles, and experience working with horses; 24.28% considered well-being and physical fitness important; and 20% highlighted sensing every movement of the horse (Figure 5).



Note*: The legend

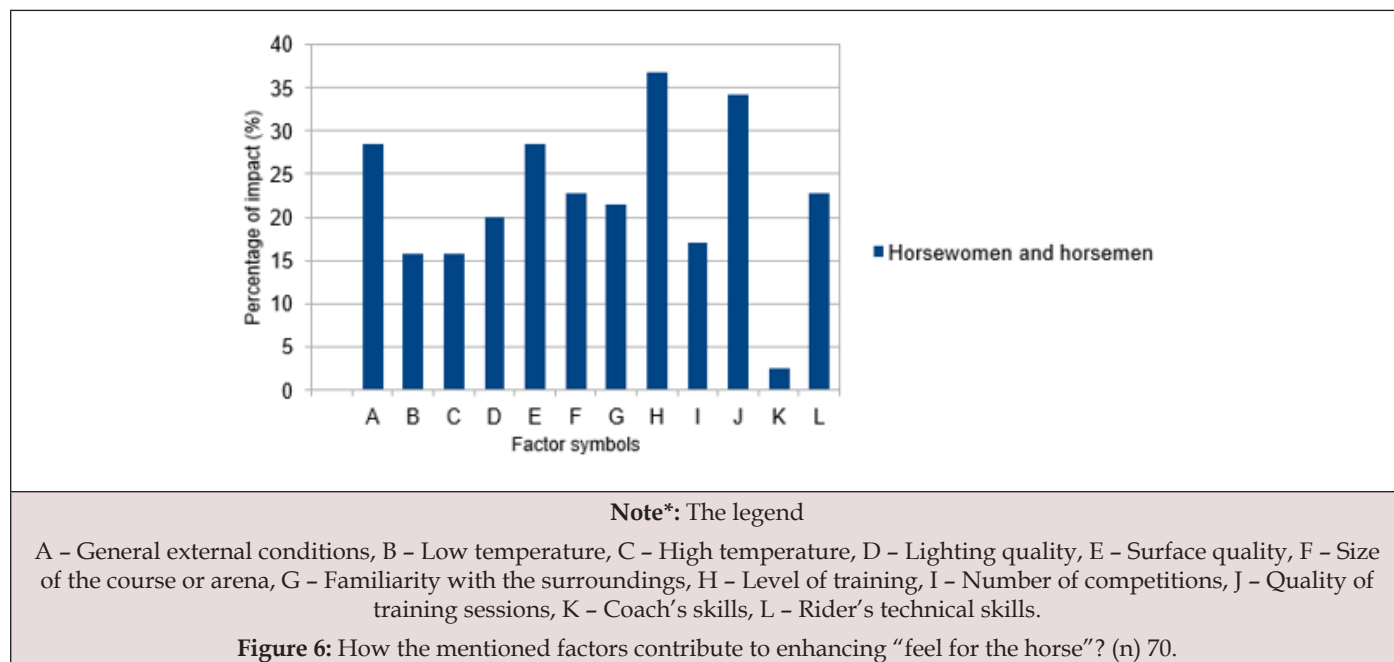
A – Ability to read the horse's movements, B – Making quick corrective movements in response to anticipated incorrect movements by the horse, C – Sensing every movement of the horse, D – Sense of distance, E – Innate aptitude, F – High level of motor coordination, G – Proprioception (muscle sense), H – High level of technical training, I – Mental resilience, J – Ability to tense and relax muscles, K – Well-being, L – Physical fitness, Ł – Experience.

Figure 5: Which qualities of a female or male rider contribute to a good “feel for the horse”? (n) 70.

Among the factors influencing a better “feel for the horse,” respondents attached the greatest importance to training status (36.71%), followed closely by the quality of training sessions

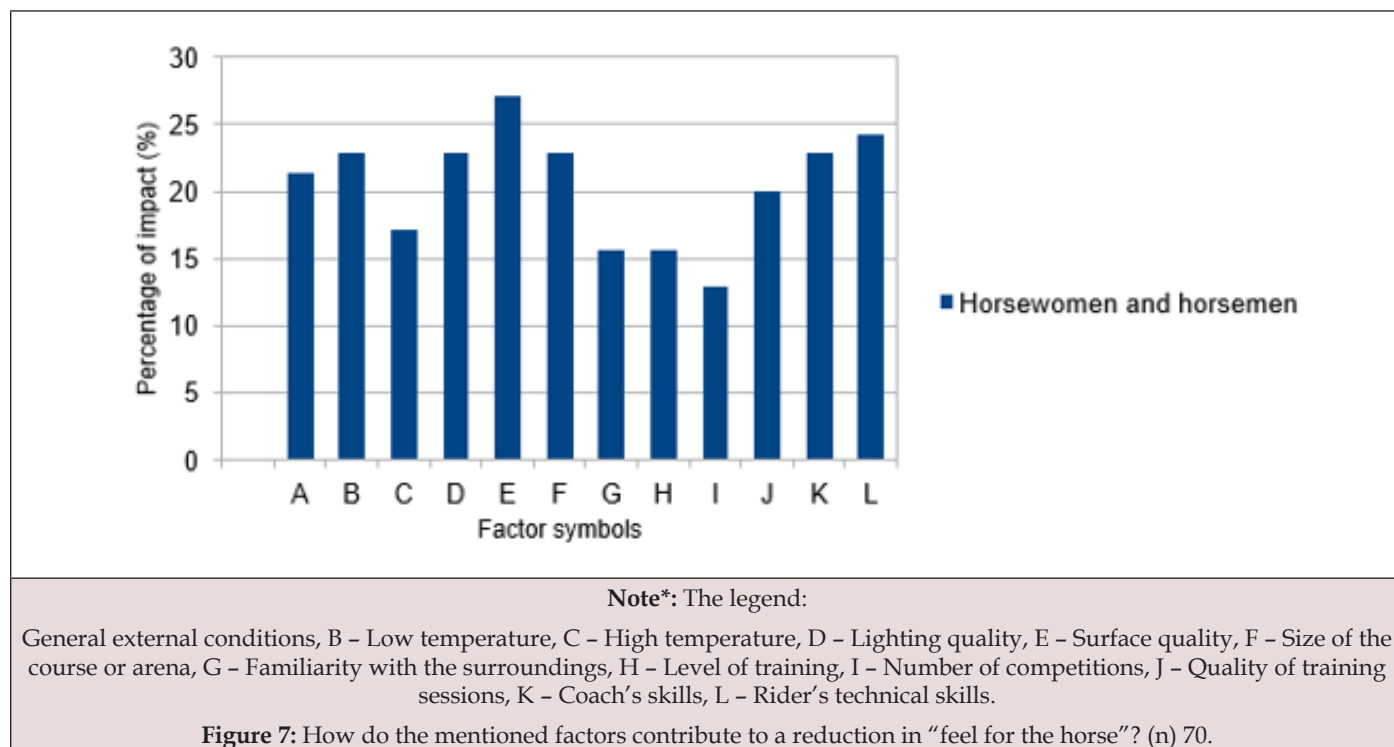
(34.28%). Further factors cited included: general external conditions and surface quality (28.58%); technical skills and the size of the course or arena (22.8%); familiarity with the surroundings

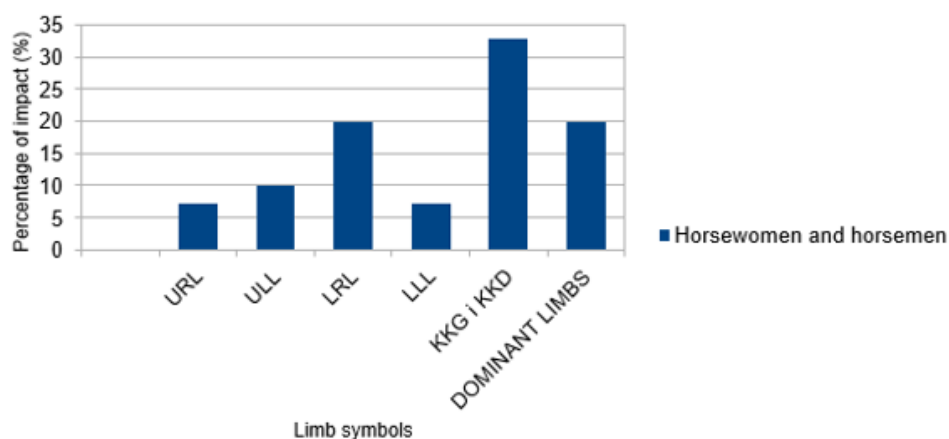
(21.42%); lighting quality (20%); competition frequency (17.14%); rider's qualifications (2.85%) (Figure 6).
ambient temperature (too high or too low) (15.71%); and the train-



Among the factors reducing the rider's "feel" for the horse, 27.14% of respondents cited the quality of the footing; 24.28% cited the rider's technical skills; 22.85% cited lighting quality, the size of the course or arena, the trainer's skills, and low ambient temperature; 21.42% cited general external conditions; 20% cited

the quality of training; 17.14% cited high ambient temperature; 15.71% cited an unfamiliar environment and a low level of physical fitness; and 12.85% cited an insufficient number of competition starts (Figure 7,8).





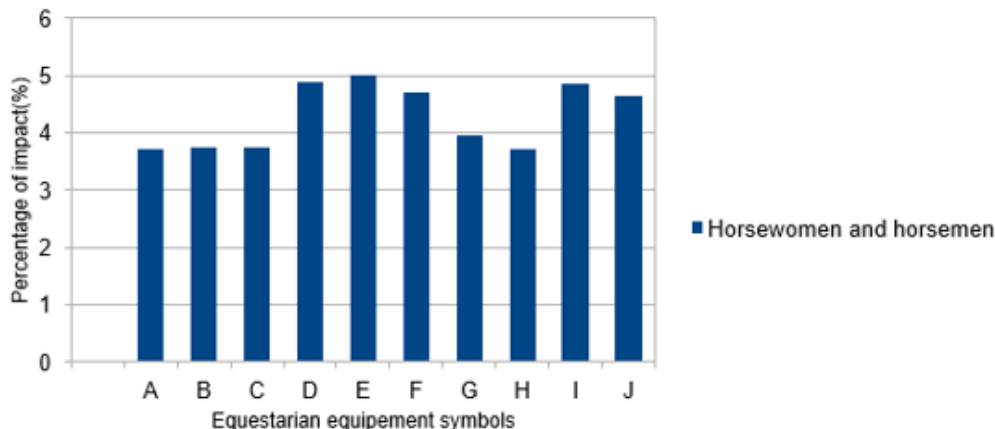
Note*: The legend:

KGP – right upper extremity, KGL – left upper extremity, KDP – right lower extremity, KDL – left lower extremity, dominant limbs – dominant limbs

Figure 8: Which of the rider's limbs "feels" the horse better? (n) 70.

When considering the individual importance of the rider's limbs for "feeling the horse," 32.85% of respondents believe the upper and lower limbs are equally sensitive; 20% cite the dominant limbs and the right lower limb; 10% the left lower limb; and 7.14% the right upper and left lower limbs (Figure 8).

When analyzing the importance of riding equipment—broadly defined—for "feeling the horse," 5% of riders identify the saddle; 4.85% cite gloves and the type of bit; 4.71% the length of the stirrup leathers; 4.64% the type of bridle; 3.96% the tightness of the girth; 3.75% breeches and the riding jacket; and 3.71% boots (Figure 9).



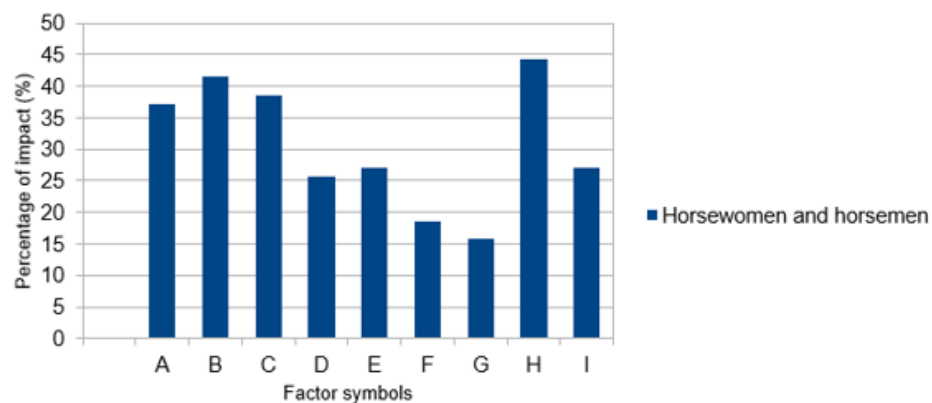
Note*: The legend:

A – Boots, B – Jodhpurs, C – Jacket, D – Gloves, E – Type of saddle, F – Stirrup leather length, G – Girth tightness, H – Rein tension, I – Type of bit, J – Type of bridle.

Figure 9: How does equestrian equipment affect the "feel of the horse"? (n) 70

94.28% of respondents perceive a link between the rider's "feel for the horse" and external conditions, while 5.71% hold the opposite view (Figure 10). According to the survey, this relationship is most frequently associated with the type of footing (41.2%), the

level of the competition (38.57%), lighting (37.14%), the quality of feed (34.2%), the audience and horse hygiene (27.14% each), temperature (25.71%), the quality of stable staff work (18.57%), and the quality of groom work (15.71%) (Figure 10,11).

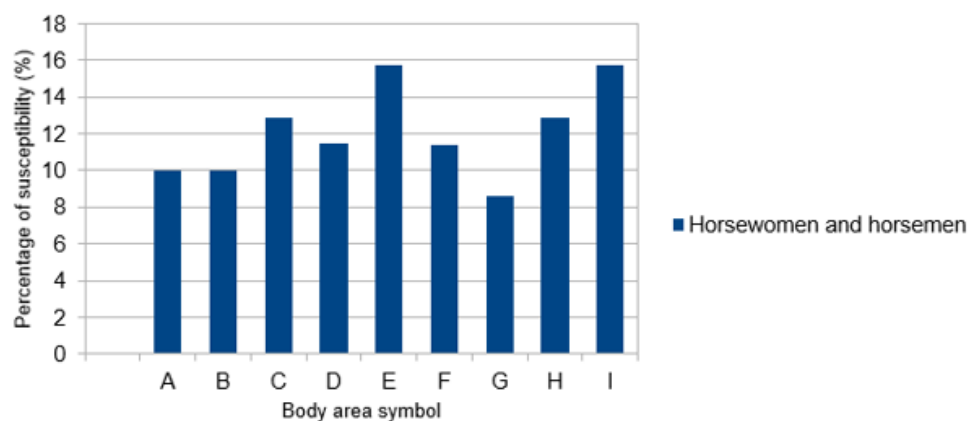


Note*: The legend:

A - Lighting, B - Surface type, C - Competition level (stress), D - Temperature (weather conditions), E - Spectators, F - Quality of stable staff work, G - Quality of groom work,

H - Quality of horse's feed, I - Horse hygiene.

Figure 10: How the listed external environmental factors affect the "feel of the horse" (n) 70.



Note*: The legend:

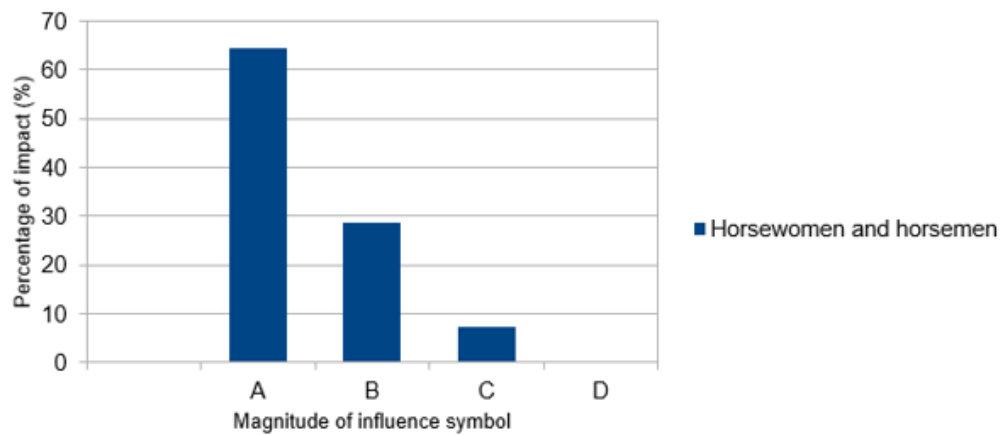
A - Head, B - Neck, C - Withers, D - Back, E - Muzzle, F - Saddlebow, G - Horse's flanks,

H - Mount, I - Body weight balance.

Figure 11: Which part of the horse's body is most susceptible to developing "feel" for the horse? (n) 70.

Among all the riders, 15.71% consider the horse's mouth and body balance (via the seat) to be the area's most conducive to developing the rider's "feel" for the horse. 12.85% identify the horse's trunk and the seat; 11.42% the pommel/cantle area and the horse's back; 10% the head and neck; and 8.57% the horse's sides (ribs) (Figure 11).

When asked about the impact of a rider's "feel" for the horse on riding technique, 64.82% of respondents state that the impact is very significant, 28.57% that it is significant, and 7.14% that it is minor. It should be noted that none of the respondents deny the existence of such an impact (Figure 12).



Note*: The legend:

A – very significant impact, B – significant impact, C – minor impact, D – no impact

Figure 12: How much of an impact does “feel for the horse” have on riding technique? (n) 70.

Among all the female and male riders surveyed, 84.29% noted the influence of the competition level on the rider’s “feel for the horse,” while 15.71% did not (Figure 13).

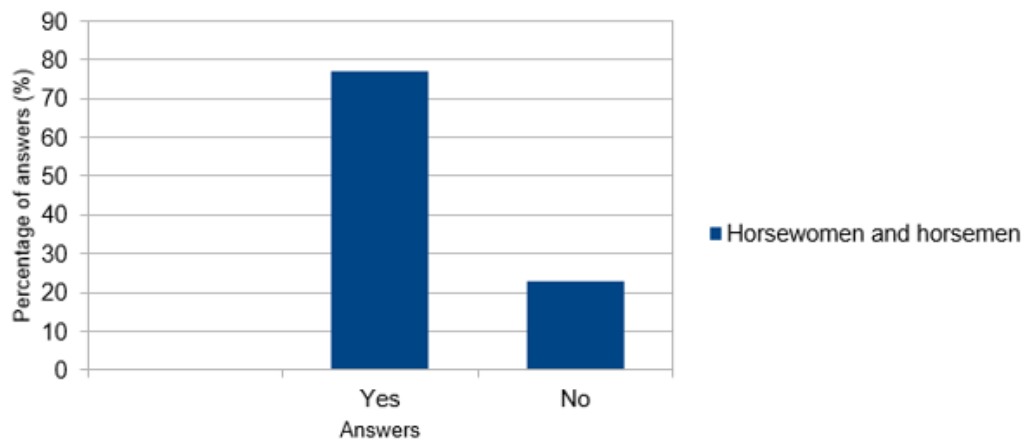


Figure 13: Is there a connection between “feel for the horse” and the level of competition? (n) 70.

91.43% of respondents indicated that the rider’s “feel for the horse” influences the final competition result, while 8.57% disagreed (Figure 14).

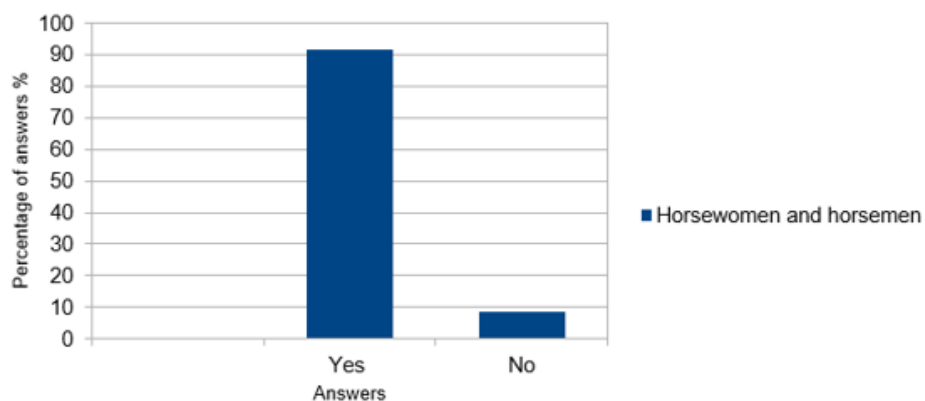


Figure 14: Is there a connection between “having a feel for the horse” and the final competition result? (n) 70.

The impact of rider fatigue on “horse feel” was acknowledged by 87.15% of respondents and denied by 12.85% (Figure 15).

According to 47.14% of respondents, the rider’s “horse feel” significantly influences the effectiveness of correcting a horse’s faulty movement, while 52.85% disagreed (Figure 16).

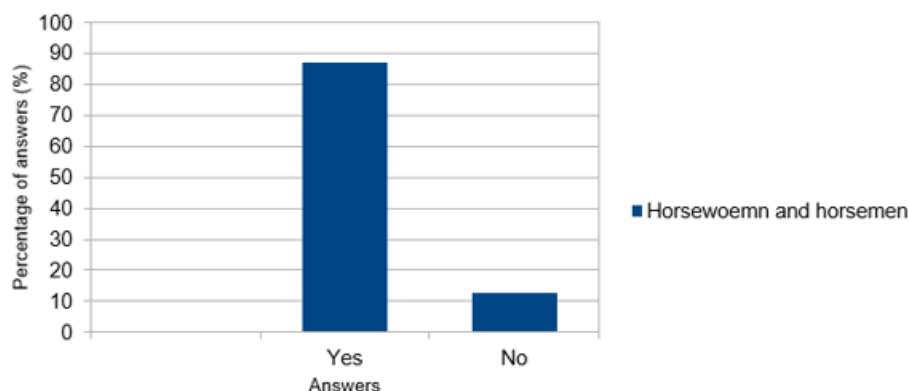


Figure 15: Is there a link between the fatigue of the female or male rider and “feel for the horse”?? (n) 70.

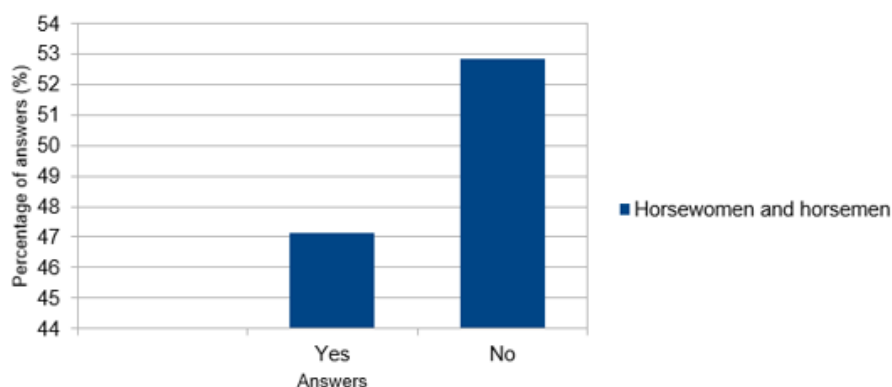


Figure 16: Is there a connection between “feel for the horse” and the effectiveness of correcting a horse’s faulty movement?? (n) (70).

According to 88.57% of respondents, the rider’s emotions influence the “feel of the horse,” while 11.44% disagree (Figure 17).

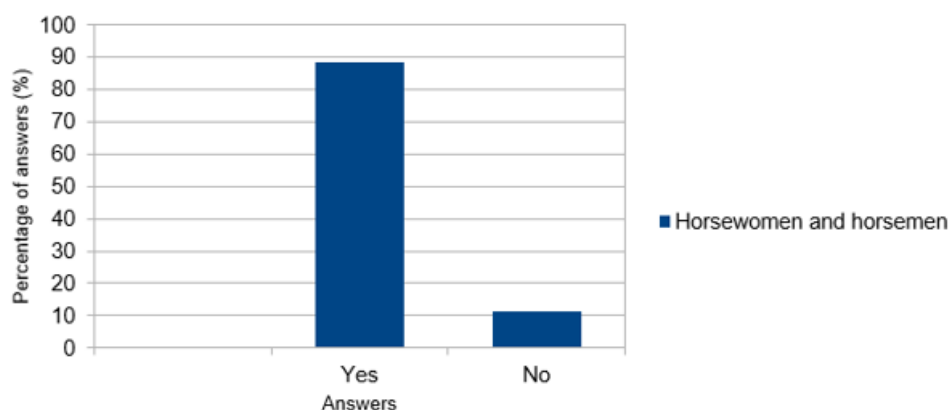


Figure 17: Is there a connection between the emotions of the female or male rider and their “feel for the horse”?? (n) 70.

Of all the subjects, 94.28% noted significant fluctuations in their “feel for the horse,” while 4.28% reported none (Figure 18).

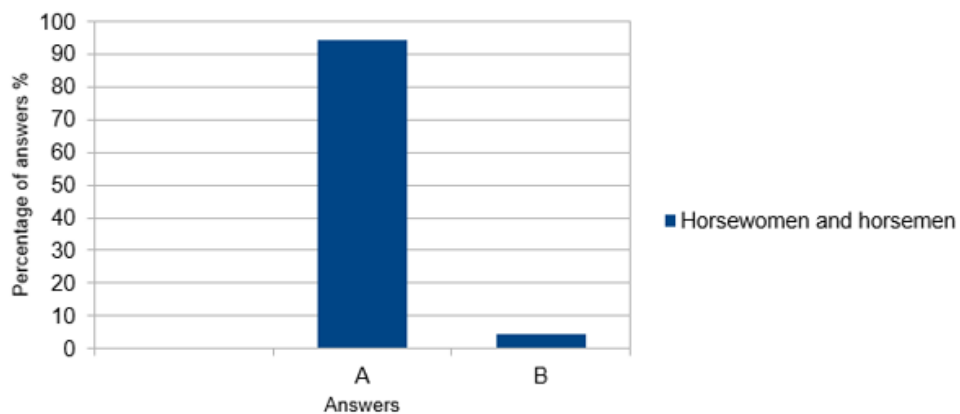


Figure 18: Do female or male riders experience fluctuations in their “feel for the horse”? (n) 70.

A link between “horse feel” and the rider’s experience was confirmed by 90% of the respondents and denied by 10% (Figure 19).

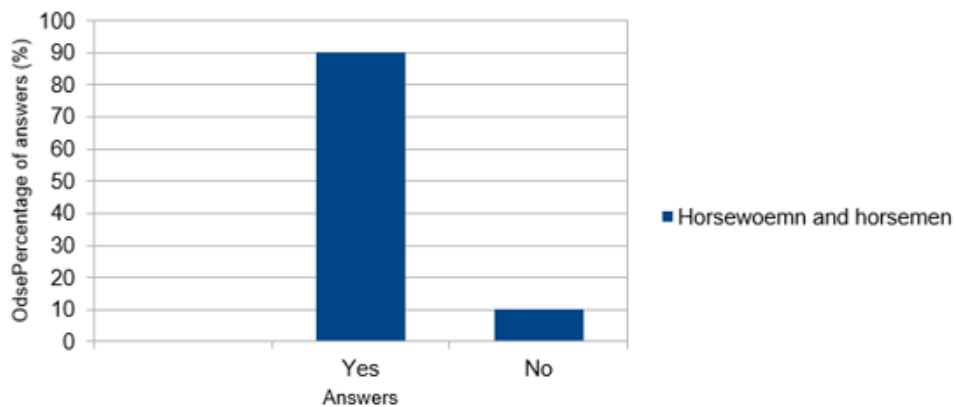


Figure 19: Is there a connection between a rider’s experience and their “feel for the horse”? (n) 70.

Regarding the question of the relationship between a horse’s level of training and “horse feel,” 72.14% answered in the affirmative and 27.14% in the negative (Figure 20).

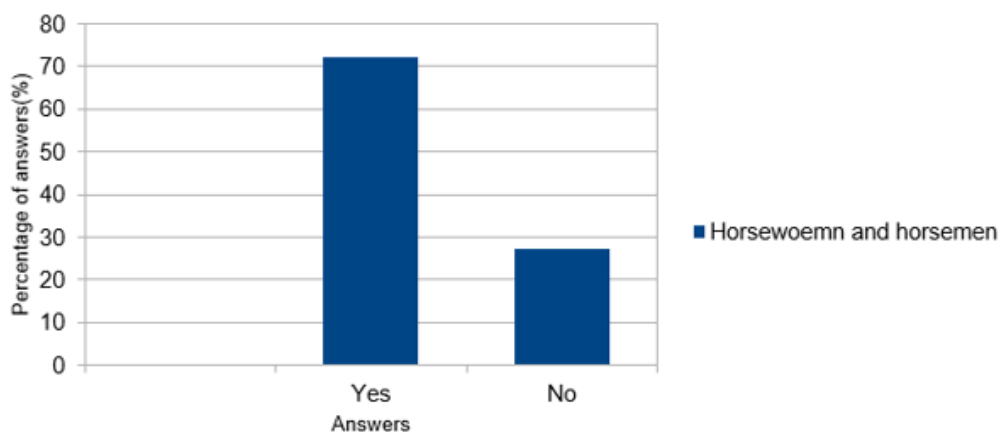


Figure 20: Is there a connection between a rider’s ‘feel for the horse’ and the horse’s level of training? (n) 70.

Among all the riders, 62.85% state that there is a significant relationship between a rider's general and specific fitness and their "feel for the horse," while 21.43% deny this (Figure 21).

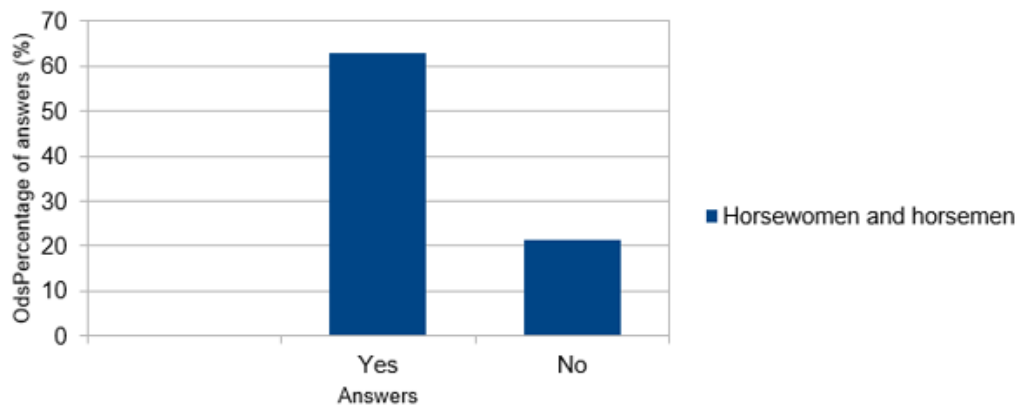
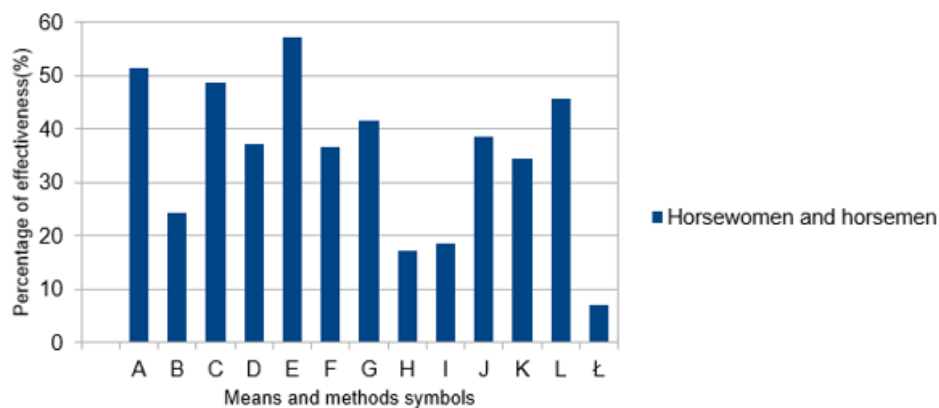


Figure 21: Is there a connection between the general and specific physical fitness of a female or male rider and their "feel for the horse"? (n) 70.

Regarding the methods used to improve "horse feel," 57.14% of respondents consider training sessions that supplement the core training program to be the most effective; 51.42% cite the frequency of core training sessions; 48.57% point to the analysis of competition performance and methods for correcting the horse's errors; 45.71% mention training on horses at varying levels of training; 41.42% cite mental training; 38.57% focus on refining movements;

37.14% highlight the analysis of the horse's behavior; 36.71% point to technical riding training; 34.28% mention training on horses with different body types; 24.28% cite competition frequency; 18.77% point to visualization of the competition run; and 17.14% mention imagery training. 7.14% of the respondents believe that "horse feel" is genetically determined (Figure 22).



Note*: The legend:

A – training frequency, B – competition frequency, C – analysis of competition proceedings and error correction, D – analysis of horse behavior, E – supplementary training, F – technical training, G – mental training, H – imagery training, I – visualization of the competition, J – focusing on the quality of the rider's movements, K – training on horses with different body posture, L – training on horses at different levels of training, Ł – genetic factors.

Figure 22: How effective are the means and methods used to improve a female and male rider's "feel for the horse"? (n) 70.

A connection between "horse feel" and the achievement of the training goal was indicated by 94.29% of the subjects and denied by 5.71% (Figure 23).

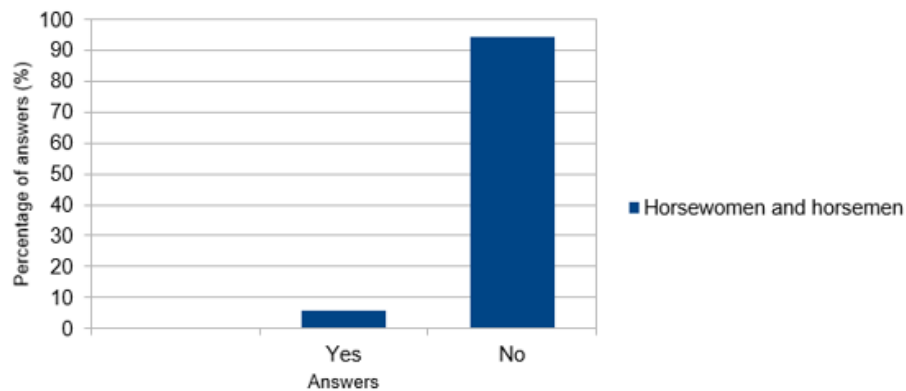


Figure 23: Is there a connection between “feeling the horse” and the goal of training? (n) 70.

According to 71.42% of the respondents, there is a connection between a rider’s “horse feel” and their level of motor coordination, while 28.58% of the competitors denied this (Figure 24). The greatest influence—observed in 68.57% of cases—was noted regarding

control of body movements when handling the horse; this was followed by 64.28% for correcting the horse’s incorrect movements, 58.28% for optimizing riding, 52.85% for fluidity, and 48.57% for riding effectiveness (Figure 25).

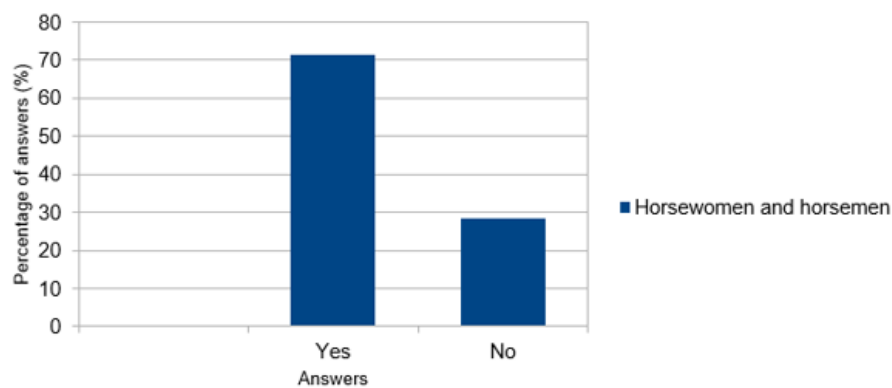
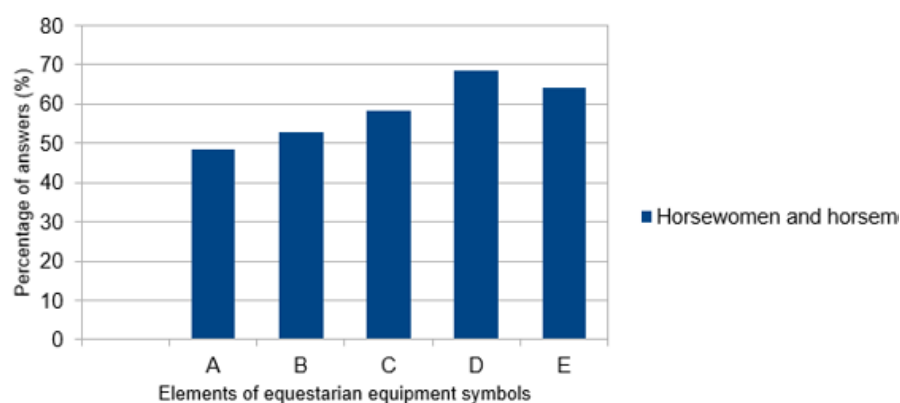


Figure 24: Is there a connection between the level of motor coordination and a rider’s “feel for the horse”? (n) 70.



Note*: The legend:

A - effectiveness, B - fluidity, C - optimization, D - control of body movements when handling the horse, E - correcting the horse’s incorrect movements.

Figure 25: How does motor coordination affect selected elements of horse riding? (n) 70.

According to 31.42% of the respondents, there is no link between “horse feel” and the rider’s motor skills, while 68.57% dis-

agree (Figure 26).

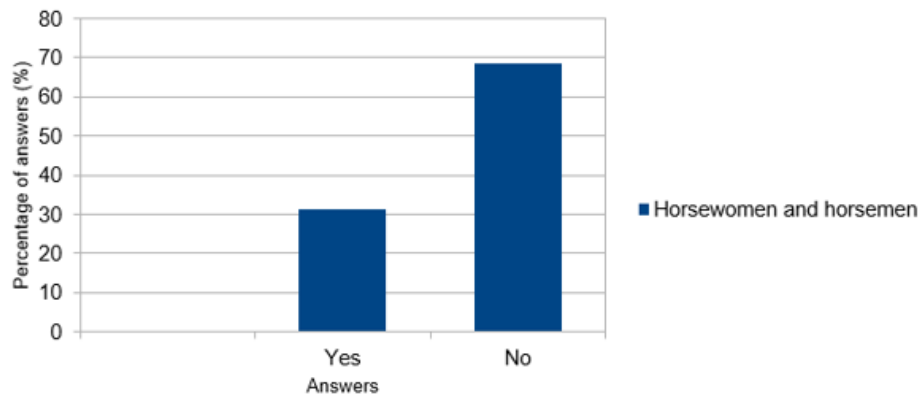
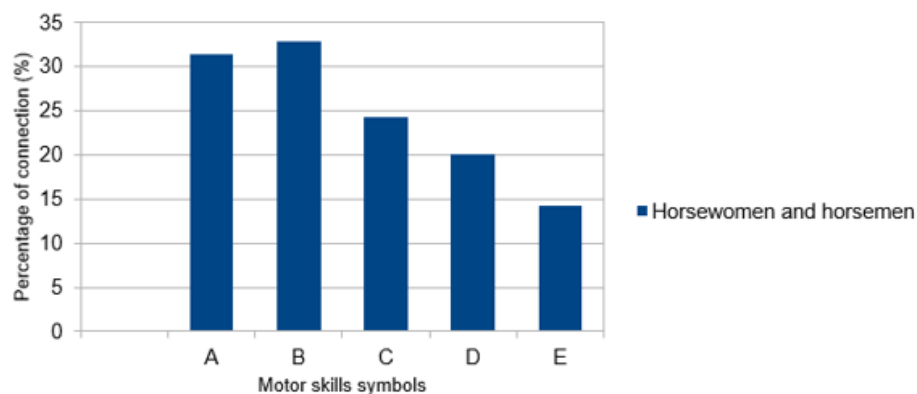


Figure 26: Is there a connection between “feeling the horse” and the rider’s motor skills? (n) 70.

According to the riders, the strongest link with “feel for the horse” is observed with motor coordination (32.85%), followed by flexibility (31.42%), strength (24.28%), endurance (20%), and speed (14.28%) (Figure 27).



Note*: The legend:

A – flexibility, B – motor coordination, C – strength, D – endurance, E – speed

Figure 27: Which motor skills are most strongly associated with “horse feel”? (n) 70.

According to 92.85% of the respondents, there is a connection between the rider’s “feel” for the horse and the horse’s “feel” for the rider; 7.15% disagree (Figure 28).

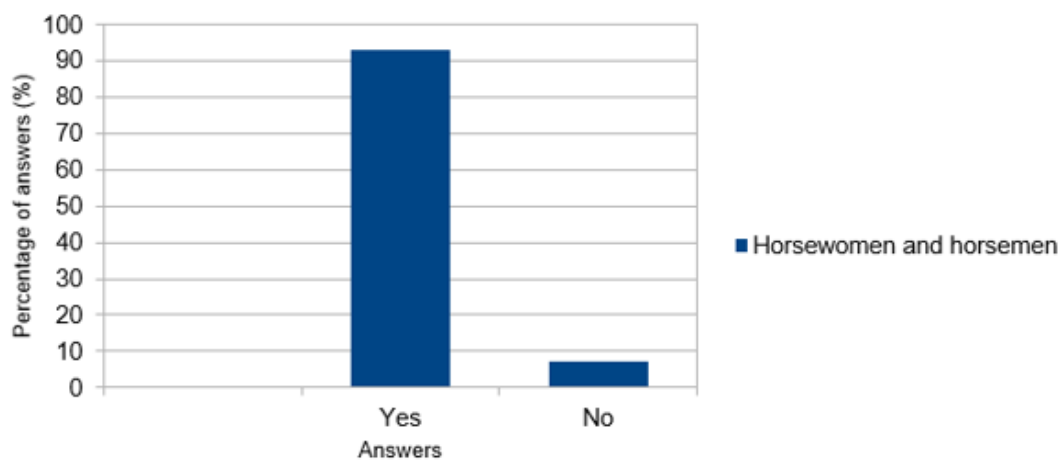
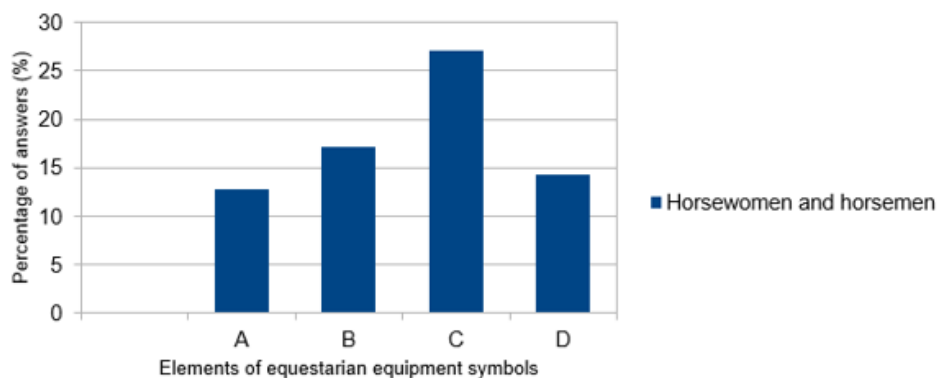


Figure 28: Is there a connection between the female and male rider’s “feel” for the horse and the horse’s “feel” for both riders? (n) 70.

The mutual connection between the horse's perception of the rider and the rider's perception of the horse is most evident—according to 27.14% of responses—in harmony, followed by mutu-

al interaction (17.14%), relaxation (14.28%), and mutual bond (12.85%) (Figure 29,30).



Note*: The legend:

A – mutual bond, B – mutual interaction, C – harmony, D – loosening.

Figure 29: In which aspects of horse riding do the mutual connections between the horse's perception of the rider and the rider's perception of the horse manifest themselves?? (n) 70.

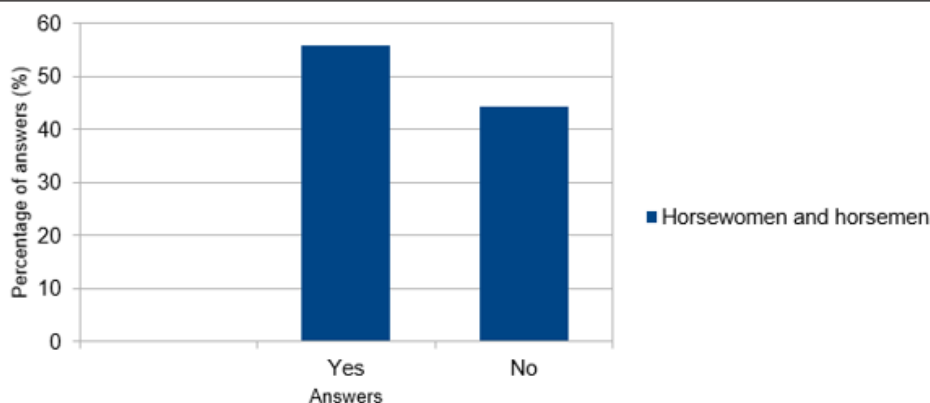


Figure 30: Is there a connection between the horse's breed and the female and male rider's "feel" for the horse?? (n) 70.

55.71% of respondents believe there is a link between a rider's "feel for the horse" and the horse's breed, while 44.29% disagree (Figure 30). 70.14% believe there is also a link regarding the

horse's height, while 14.28% disagree (Figure 31); 58.28% of those surveyed claim such a link exists regarding the horse's sex, while 48.42% disagree (Figure 31,32).

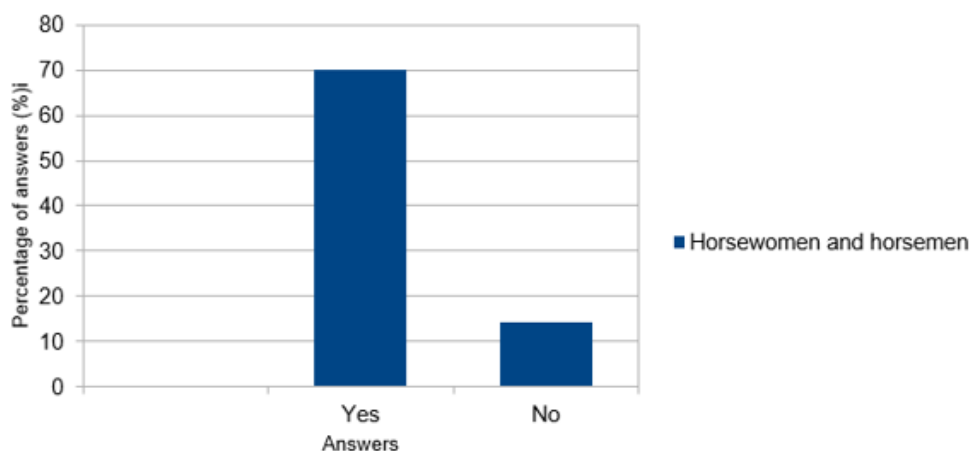


Figure 31: Is there a connection between a horse's height and the female or male rider's "feel" for the horse? (n) 70.

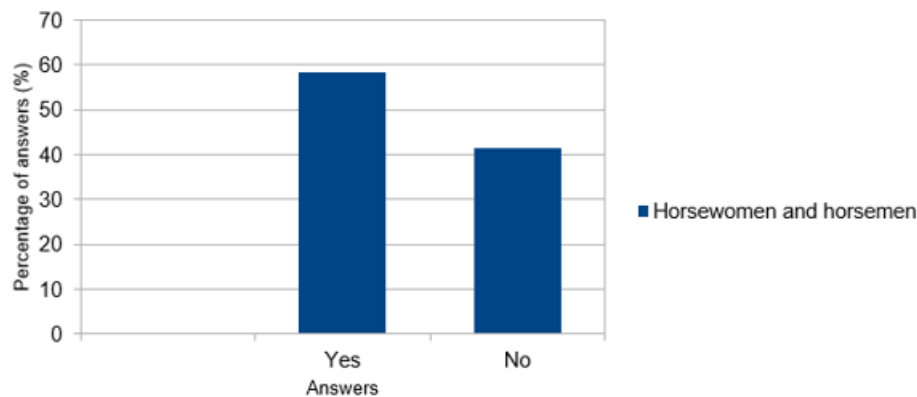


Figure 32: Is there a connection between a horse's gender and the female and male rider's 'feel for the horse'?? (n) 70.

Discussion

The results obtained cannot be compared with others, as no identical or similar findings were identified in the relevant literature. The issue of kinesthesia in equestrian sports has not previously been addressed; the survey presented here represents the first attempt to explore this topic. The forty-two questions included in the survey were reviewed in consultation with coaches specializing in eventing, show jumping, and dressage. While they all agreed that a rider's "feel for the horse" is a crucial element of training, competition, and general interaction with the animal, they considered the concept of a horse's "feel for the rider" highly debatable—even jokingly suggesting that the horse itself should be asked. I asked—and it laughed. The findings were compared with the results of a study by Starosta [4] involving athletes from other sports disciplines. Respondents quite often supplemented their answers with their own observations, feelings, and comments, with female riders proving to be more open and candid. The study indicates that riders primarily equate "posture sense" with synchronizing their posture (body) with the horse's movement, as well as controlling their center of gravity and all bodily movements to ensure proper handling of the horse. Key attributes required for a rider to effectively "feel" the horse include the ability to interpret the horse's movements and innate genetic predispositions. The participants are aware of the reciprocal relationship between the rider "feeling" the horse and the horse "feeling" the rider. They consider it essential to improve their general and sport-specific fitness and the precision of limb movements—primarily through supplementary training alongside core training and frequent competition participation. At the same time, they do not perceive a significant link to general motor abilities or movement coordination. They associate "feeling the horse" with the duration of core training, external conditions (surface type and competition level), and the horse's height, breed, and sex. They also note a connection between "feeling the horse" and achieving training goals, final competitive results, and riding technique. Riders hone their ability to "feel the horse" through the quality of their core training sessions. They attribute impairments in this sense to surface quality and insufficient technical skills, while also noting fluctuations linked to training experience, emotions, fatigue, and

the level of the competition. According to the respondents, "horse feel" is not significantly related to the correction of incorrect movements or the horse's movement capabilities. At the same time, they note its substantial impact on riding technique and the final competition result.

Research by Starosta [4] indicates that volleyball players defined "court sense" as the ability to position and move correctly on the court and to play the ball to the right spot on the opponent's side. This entails knowing how to position oneself, moving quickly across the court, and the ability to rapidly track the ball and the opposing player. Respondents associated good "court sense" with effective court play, a strong attack, and successfully hitting past the opponent's block. Conversely, they associated poor court sense with incorrect positioning and movement, weak court play, poor blocking positioning, hitting the ball out of bounds, and inaccurate ball placement. 80% of the surveyed players reported experiencing optimal "court sense" during the initial phase of the season training; 12% considered it a transitional period, while 68% identified it as the preparatory period. Conversely, 28% felt they had the poorest "feel for the court" during the transitional period, attributing this to end-of-season fatigue and a lack of concentration. 76% reported their best "feel" during the main part of the training session, and 26% during the final part. The worst "feel" occurred during the introductory part of the session (reported by 88% of respondents), while 3% experienced it during the final part. Basketball players stated that "ball feel" is closely linked to their dominant limb and that the accuracy of upper and lower limb movements is equal. The study's author noted that each respondent had their own individual definition of "ball feel," manifesting as passing precision and ease of movement and execution of technical skills involving the ball. They also unanimously agreed that this ability stems primarily from training experience. Players identified negative indicators of "feel" as including, among others: traveling violations, errors in judging distance, and difficulties with dribbling or initiating movement while dribbling. Among soccer players, 86.6% reported their best "ball feel" during the competitive season, 3.3% during the transitional period, and 1.8% during the preparatory period. 94.2% of footballers perceive a link between the level of this

“feel” and athletic performance, while 2.5% do not observe such a connection in their own case. 77.1% of respondents believe their dominant leg has a better “feel” for the ball, whereas 3% reported a similar level of “feel” in both legs. For 56.8%, this “feel” is innate, though 6.3% acknowledged the possibility of improving it through the systematic and symmetrical execution of technical skills. 96.8% of players noted the influence of external conditions; 37% associated this with low temperatures, while optimal conditions were seen as conducive to a better “feel” (16.2%). 26.2% of footballers observed a negative impact of emotions on playing technique, and 24.3% on their “feel” for the ball. According to table tennis players, “feel for the ball” manifests in shot accuracy, playing effectiveness, error rates, optimal responses to an opponent’s shot (resulting in an effective return), and the soundness of decisions made. Respondents attributed the quality of this “feel” to external factors (systematic training, motivation, equipment quality, climatic conditions, and lighting) as well as internal factors (predispositions and psycho-physical state).

Conclusions

- a. The results obtained from the study of female and male riders across various equestrian disciplines indicate that, despite the considerable complexity of the issue of rider kinesthesia, the subject is now better understood.
- b. Riders are aware of the importance of the factors underlying the “rider’s feel for the horse.”
- c. The study participants recognize the need for—and are

familiar with methods of—improving their “feel for the horse,” yet they do not perceive a link between this ability and general motor skills.

- d. Despite their practical knowledge, there is a need for comprehensive education regarding fundamental and supplementary sports training that incorporates elements of kinesthesia in equestrianism.

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Conflict of Interest

None.

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