# 27 - CONSTRUCTION OF A MATRIX FOR THE ANALYSIS OF THE ROLLER SKATING SLIDING MOVEMENT: FIRST PHASE

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**Introduction**

According to the Brazilian Skating Confederation, the figure skating developed in Europe, was initially used as transportation means to cross over frozen canals and lakes, later becoming an entertainment activity. Shortly after, contests to verify who could make the most complex designs appeared, giving origin to the current skating technique. The roller skating emerged as an alternative transportation means when lakes and canals defrosted. In Brazil, this activity was brought from Europe by wealthy families firstly to São Paulo at the beginning of the XX century as an entertainment activity.

The roller skating practice requires the performance of a number of complex movements, according to the ability of the skater. Sliding forward is the first movement that should be learned and performed in order to develop the different movements and peculiar rules of the distinct skating modalities. A good skating athlete is considered as that who achieves developing all technical movements without concerning with the fact that he or she is on a skate (Zechin, 2003). According to Schmidt & Wrisberg (2001), this is only possible when the individual reaches a learning level in which the performance becomes more precise and consistent. With a good idea of the performance general standard, the skater has the opportunity of beginning a refinement process, modifying and adapting that standard to reach specific environmental demands, in other words, the skater leaves the initial learning stage and enters a higher one.

When a given movement is taught, it is important considering the development phases and levels that the individuals are found in order not to underestimate or overestimate their necessities, so that a higher teaching-learning level and performance are successfully reached. It is also important emphasizing that the learning of a new motor skill occurs at learning levels and stages present in the main theoretical models proposed by motor behavior researchers, changing in function of the emphasis given to automation (Pelegrine, 2000).

The objective of this study was to construct a matrix for the analysis of the basic characteristics of sliding forward on a roller skate. In order to know the basic characteristics of the sliding ability, some parameters for the evaluation of this ability were created. According to Morrow *et al* (2003), an analysis matrix is an evaluation means and is motivated, at least in part, by the conviction that this method facilitates the teaching process, intensifies the learning process and results in a general improvement of the skater, thus collaborating in the pedagogical interventions. The attainment of well-defined criteria not only guides the evaluation process but also aids in the elaboration of pedagogical methods, improving the learning process.

**Methodology**

The first stage of this work was to elaborate an instrument aimed at describing the movement of sliding on a roller skate in details. A material containing the execution of the movement of sliding forward on a roller skate was initially organized. This description was based on observations performed in videos of national and international skate championships, classes and skate exhibitions with elite athletes and experienced adults. The videos were carefully watched, once in order to evaluate a given movement, the careful observation of this movement is also important. This ability is not constructed in a simple and quick way, but rather through the association of knowledge and exercises in an observation practice, knowledge on the kinesiology area and through the experience of skilful professionals (Knudson & Morrison, 2001).

The performance of observations in videos occurred with the objective of defining the first parameter for the description of the movement, in other words, to detect the main characteristics of the ability. This occurred through the observation of the body positions during the sliding movement among the individuals analyzed. According to Knudson & Morrison (2001), the main characteristics of a given movement are similar to descriptions of specific body movements, possible to be observed to be later used to evaluate whether important mechanical factors involved in this movement presented ideal performance.

The second stage was to send the material containing the descriptions of the sliding movement to movement-specialized Physical Education professionals, who performed corrections and suggestions in the description of movements, language, tense and technical significances. After these alterations, the following stage was to send this corrected description material to skating professors with wide experience on the sports modality. Some small suggestions have been recommended in order to facilitate the comprehension of phrases.

The material containing the ability description took into consideration aspects that could draw the basic observable characteristics of sliding forward on roller skate in freestyle skating. The description were divided into phases, in other words, according to Carr (1998), a group of movements that appears independent and that the athlete arranges together in the full performance of the ability in order to better identify mistakes and successes of the student, according to the description given below:

**Execution phase I:** this phase was divided into two moments, the moment before the impulse (preparation) and the impulse execution (performance of the movement), as suggested by Honório (1998), considering the impulsion leg only, or the leg that loses contact with the ground, also observing each part of the body separately such as head, arms, trunk, legs and feet. **Execution phase II:** also divided into two moments, the moment before sliding (preparation) and the sliding execution (performance of the movement), considering the leg that does not lose contact with the ground, also observing each part of the body separately such as head, arms, trunk, legs and feet. **Execution phase III:** the transition moment to the 2nd impulse with leg exchange was considered, in other words, the movement in which the support leg that was on the ground, will become the impulsion leg and will lose contact with the ground in order to continue the movement, also considering each part of the body separately such as head, arms, trunk, legs and feet.

The third stage of the work was the verification of the descriptions already established. To do so, five figure skating professors of the state of Rio Grande do Sul experienced in teaching this sports modality were invited and accepted participating in the study. The descriptions were sent by regular mail. After the return of the material, the total agreement of the professors in relation to the descriptions presented could be verified. The instrument with the description of movements in each phase presented two options for each description, one agreeing and another disagreeing. In case of disagreement, comments on the item were requested. It was also requested from professors to describe the most common mistakes in each execution phase and body segments.

From the five skating professors who collaborated in the last stage for the construction of the instrument, three of them had over than twenty-two years of skating teaching experience and two of them more than 8 years of experience; all of them still in active duty. Moreover, all professors had been skaters, three of them as national and/or international competition athletes. All of them were involved in Physical Education and three of them were already graduated. It is worth stressing the professors' experience time in this third stage of the study, once it is considered that the analysis ability increases with the experience in tasks involving movement observation (Sarmento *et al*, 1991).

**The Analysis Matrix**

The tables below present the descriptions of the ability of sliding forward on roller skates divided into three phases,

where phases I and II present two moments: preparation and execution, and phase III presents the impulse transition. For each phase, there are items with important observations in relation to the body position and body parts in separated, as well as the movement sequence and execution. The values have been taken arbitrarily and include a range from the incapacity to perform the movement to its correct performance. As a general indicative to quantify results, the following scoring is suggested for each description: does not perform: 0; performs the movement partially or with difficulty: 0.5; performs the movement correctly: 1.

**Table 1. EXECUTION PHASE I - PREPARATION**

| DESCRIPTION OF THE MOVEMENT AND SCORE | DESCRIPTION OF THE MOVEMENT AND SCORE |
|---|---|
| HEAD:<br>❖ Turned forward. (_____)<br>❖ Stare forward and at the horizon. (_____) | LEGS<br>❖ Slight knee flexion in the impulsion leg. (_____) |
| TRUNK:<br>❖ Keeps an erect vertical posture. (_____)<br>❖ Slight projection of the chest forward (lumbar hyperextension). (_____) | FEET:<br>❖ Positions foot (impulse) behind the support foot (_____)<br>❖ Foot tip (impulse) close to the support foot. (_____)<br>❖ Foot tip (impulse) turned out of the body intermediate line. (_____) |
| ARMS:<br>❖ Aside and apart from the body. (_____)<br>❖ Arms height variation between shoulder line and waistline. (_____)<br>❖ Elbows stretched out (_____)<br>❖ Hands opened and palms turned down. (_____)<br>❖ Fingers united at the arms prolongation. (_____) | **MAXIMUM SCORE ( 13 )**<br><br>**SCORE REACHED ( )** |

**Table 2. EXECUTION PHASE II - MOVEMENT**

| DESCRIPTION OF THE MOVEMENT AND SCORE | DESCRIPTION OF THE MOVEMENT AND SCORE |
|---|---|
| HEAD:<br>❖ Turned forward. (_____)<br>❖ Stare forward and at the horizon. (_____) | LEGS:<br>❖ There is a simultaneous elevation of the leg backward and side separation of the impulsion leg in relation to the support leg (which is on the ground). (_____)<br>❖ There is a knee extension when foot is removed from the ground. (_____)<br>❖ Leg is suspended and firmly extended on air after losing contact with ground. (_____) |
| TRUNK:<br>❖ Slightly turned forward but erect. (_____)<br>❖ Slight projection of the chest forward (lumbar hyperextension). (_____)<br>❖ Keeps stable during movement. (_____) | FEET:<br>❖ The body weight is dislocated to the sliding foot (which will remain on the ground). (_____)<br>❖ The impulse is performed by pushing the foot against the ground, backward and laterally at once with the 4 wheels. (_____)<br>❖ At the end of the impulse, the foot loses contact with the ground in the movement prolongation. (_____)<br>❖ The foot becomes stable with tip turned downward “ballerina’s foot” (plantar flexion). (_____)<br>❖ Keeps steadily in the air. (_____) |
| ARMS:<br>❖ Aside and apart from the body. (_____)<br>❖ Arms height variation between shoulder line and waistline. (_____)<br>❖ Elbows stretched out. (_____)<br>❖ Hands opened and palms turned down. (_____)<br>❖ Fingers united at the arms prolongation. (_____) | **MAXIMUM SCORE ( 18 )**<br><br>**SCORE REACHED ( )** |

**Table 3. EXECUTION PHASE II - PREPARATION**

| DESCRIPTION OF THE MOVEMENT AND SCORE | DESCRIPTION OF THE MOVEMENT AND SCORE |
|---|---|
| HEAD:<br>❖ Turned forward. (_____)<br>❖ Stare forward and at the horizon. (_____) | LEGS:<br>❖ Knees slightly inflected. (_____) |
| TRUNK:<br>❖ Keeps an erect vertical posture. (_____)<br>❖ Slight projection of the chest forward (lumbar hyperextension). (_____) | FEET:<br>❖ Tip slightly turned to the external portion of the body intermediate line. (_____) |
| ARMS:<br>❖ Aside and apart from the body. (_____)<br>❖ Arms height variation between shoulder line and waistline. (_____)<br>❖ Elbows stretched out. (_____)<br>❖ Hands opened and palms turned down. (_____)<br>❖ Fingers united at the arms prolongation. (_____) | **MAXIMUM SCORE ( 11 )**<br><br>**SCORE REACHED ( )** |

**Table 4. EXECUTION PHASE II - MOVEMENT**

| DESCRIPTION OF THE MOVEMENT AND SCORE | DESCRIPTION OF THE MOVEMENT AND SCORE |
|---|---|
| HEAD:<br>❖ Turned forward. (_____)<br>❖ Stare forward and at the horizon. (_____) | LEGS:<br>❖ Knees perform a slight extension. (_____)<br>❖ Knees keep semi-inflected during sliding until leg exchange. (_____) |
| TRUNK:<br>❖ Slightly turned forward but erect. (_____)<br>❖ Slight projection of the chest forward (lumbar hyperextension). (_____)<br>❖ Keeps stable during movement. (_____) | FEET:<br>❖ The support foot performs a small trajectory in front of the body intermediate line. (_____) |
| ARMS:<br>❖ Aside and apart from the body. (_____)<br>❖ Arms height variation between shoulder line and waistline. (_____)<br>❖ Elbows stretched out. (_____)<br>❖ Hands opened and palms turned down. (_____)<br>❖ Fingers united at the arms prolongation. (_____) | **MAXIMUM SCORE ( 13 )**<br><br>**SCORE REACHED ( )** |

**Table 5. EXECUTION PHASE III - IMPULSE TRANSITION**

| DESCRIPTION OF THE MOVEMENT AND SCORE | DESCRIPTION OF THE MOVEMENT AND SCORE |
|---|---|
| HEAD:<br>❖ Turned forward. (_____)<br>❖ Stare forward and at the horizon. (_____) | LEGS:<br>❖ Knee of the support leg slightly inflected. (_____)<br>❖ The impulse leg is back on the ground, getting close to the support leg in front of it with knees inflected. (_____) |
| TRUNK:<br>❖ Slightly turned forward but erect. (_____)<br>❖ Slight projection of the chest forward (lumbar hyperextension). (_____)<br>❖ Keeps stable during movement.(_____) | FEET:<br>❖ **Support foot** with tip turned forward and slightly external. (_____)<br>❖ **Impulse foot** is back on the ground close and in front of the support foot with all 4 wheels on the ground. (_____)<br>❖ Impulse foot tip turns forward and slightly turned to the external portion of the body intermediate line. (_____) |
| ARMS:<br>❖ Aside and apart from the body. (_____)<br>❖ Arms height variation between shoulder line and waistline. (_____)<br>❖ Elbows stretched out. (_____)<br>❖ Hands opened and palms turned down. (_____)<br>❖ Fingers united at the arms prolongation. (_____) | **MAXIMUM SCORE ( 15 )**<br><br>**SCORE REACHED ( )** |

**TOTAL MAXIMUM SCORE: 70** **SCORE REACHED: (____)**

**Considerations**

Reaching success in some sports modality more and more depends on well-developed basic movement elements of individuals, who consider the teaching-learning process as the element that transmits information in the environment, as well as on the element that receives, processes and uses the movement execution (Tani, 1989).

According to Morrow et al (2003), the analysis matrix is considered as an alternative evaluation means, once it is one among a wide variety of non-traditional techniques and serves more for the reference criteria than for the reference norms and the score is frequently based on subjective judgments. The same author also pointed that this evaluation is supported by reference criteria, regardless the type of evaluation task, and the performance of a given individual is evaluated according to the standard described or on the desired yield. The instrument is in agreement with Gallahue & Ozmum (2005), who report that the instrument incorporate a pre-established standard in which the individuals' levels are compared considering whether or not the individual reaches the performance objectives (standard). The analysis matrix has shown to be relevant for studies on skating and enables skating professors and other professionals to monitor alterations on the learning process in relation to the ability of sliding and to identify difficulties in obtaining explanations on the instructive strategies.

The instrument also presents a classification and the objective of being a process instrument, once it is aimed at form, style and mechanics employed to perform the desired ability, and the attention is not only aimed at the ability performance outcome. Gallahue & Ozmum (2005) emphasize that a process instrument may be the best choice to evaluate the motor abilities standards of a pre-school age child, and a product-oriented approach would be more suitable to evaluate adult individuals; however, the most adequate selection of the evaluation instrument requires considering the reasons through which is has been performed. Thus, the instrument of this study will consider the individual apprenticeship development rather than age, once the instrument, as previously reported, is concerned with the dimensions of the desired performance execution development, important for the learning process.

In short, few studies have investigated the roller figure skating in Brazil. Figure skating professional who wish to work with human movement must be updated, not focusing their work on information based on practice only, but rather compare their results with the opinion from specialists and scientific researches, once these sources contribute for the attainment of a knowledge support in relation to the activity itself and to the divulgation of this sports modality (Knudson & Morrison, 2001). Therefore, the evaluation instrument elaborated will encourage the performance of further studies within skating sports.

As a first effort, this phase was considered as an important process for the elaboration of a movement analysis matrix to evaluate sliding with roller skate. From this point on, efforts aimed at testing its reliability and applicability at different levels of skaters and professionals must be performed.

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**CONSTRUCTION OF A MATRIX FOR THE ANALYSIS OF THE ROLLER SKATING SLIDING MOVEMENT: FIRST PHASE**

**Abstract**

The ability of sliding forward is the first movement one should learn and perform in order to develop the different movements and peculiar rules of the distinct skating modalities. For the successful teaching-learning process of this ability, knowing the characteristics of this skill, among other factors, is very important because it provides parameters for its evaluation. Thus, the objective of this work was to construct a matrix for the analysis of the basic characteristics of sliding forward on a roller skate. In the first stage, a descriptive model of the ability of sliding forward based on observations of the movement through videos and skating championships was built. The descriptions were structured and divided into: execution phase I, which considered the moment still

and the leg impulsion movement plus the behavior of the body parts in separated; execution phase II, which observed the sliding leg (ground) and execution phase III, which considered the moment of the second impulse with leg exchange. After this stage, Physical Education and Skating professors performed reviews and corrections of the descriptions in order to be the clearest as possible. The material containing the descriptions was sent to skating professors of the state of Rio Grande do Sul with the objective of verifying and performing considerations on the descriptions elaborated. All professors agreed with the descriptions and listed the most common errors during the execution of each phase, thus enabling the formulation of the matrix for the analysis of the sliding movement. The model resulting from this study is presented as a first version that will enable evaluations and hence will favour interventions on the sliding ability teaching-learning pedagogical process.

**Keywords:** sliding, skating, analysis matrix

**CONSTRUTION D'UN MODELE POUR L'ANALYSE DU MOUVEMENT DE GLISSER AVEC DES PATINS ROULANTS: PREMIERE PHASE**

**Resumée**

L'habilité de glisser devant est le premier mouvement qui doit être appris et realisé pour développer les différents mouvements et règles des plus diverses modalités de la patinage. Pour que l'enseignement/apprentissage de cette habilité obtiènne de succès, parmis beaucoup de facteurs, la connaissance des caractéristiques de l'habilité a une grande importence, car fournit de la borne pour une évaluation. De cette façon, ce travail a comme cible la constrution d'un modèle d'analyse des caractéristiques basiques de la modalité de glisser devant sur de patin roulant. Dans la première étape on a construit un modèle descriptif de l'habilité de glisser devant, à partir des observations du mouvement à travers vidéos et championats de patinage. Les descriptions ont été organisées et partagées dans: phase d'éxecution I, qui concerne le moment statique et de mouvement de jambe d'impulsion plus la conduite des partes du corps de façon isolée; phase d'éxecution II, qui concerne la jambe glissante (par terre) et phase d'éxecution III, le moment de la deuxième impulsion avec l'invertion de jambe. Après cette étape, les professeurs de éducation physique et patinage ont realisé des analyses et corrections qu'il fallait aux descriptions à fin de les faire le plus claires possible. Le materiél avec les descriptions a aussi été envoyé aux professeurs de patinage de l'état Rio Grande do Sul pour qu'ils puissent confirmer et réaliser des considerations necessaires sur les descriptions élaborées. Tous les professeurs sont d'accord avec les descriptions et ont énumeré les fautes plus courrantes pendant l'éxecution de chaque phase, en favorisant la formulation du modèle pour l'analyse du mouvement de glisser. Le modèle qui a resulté de cet étude se présente comme une première version qui va possibiliter des évaluations et va aussi favoriser les interventions dans le processus pédagogique de l'enseignement/apprentissage de l'habilité de glisser. **Mots Clés:** glisser, patinage, modèle d'analyse

**CONSTRUCCIÓN DE UNA MATRIZ DE ANÁLISIS DEL MOVIMIENTO DE DESLIZARSE EN PATINAJE SOBRE RUEDAS: PRIMERA FASE**

**Resumen**

La habilidad de avanzar hacia delante es el primer movimiento que se debe aprender y realizar para desarrollar los diferentes movimientos y reglas propios de las distintas modalidades relacionadas con el patinaje. Para que el aprendizaje de esta habilidad tenga éxito, entre varios factores, conocer las características de esta habilidad es de gran importancia, porque suministra parámetros para su evaluación. Siendo así, este trabajo tuvo como objetivo construir una matriz de análisis de las características básicas de la habilidad para deslizarse hacia delante en patinaje sobre ruedas. En la primera etapa se construyó un modelo descriptivo de la habilidad en deslizar hacia delante, a partir de observaciones de movimiento en videos y campeonatos de patinaje. Las descripciones se estructuraron y dividieron en: Fase de ejecución I, que consideró el movimiento parado y el movimiento de impulso de la pierna más el comportamiento de las partes del cuerpo en forma separada; fase de ejecución II, que observó la pierna que se desliza sobre el suelo y fase de ejecución III, siendo el segundo movimiento de impulso con el cambio de pierna. Después de esta etapa, profesores de Educación Física y patinaje realizaron las revisiones y correcciones necesarias de las descripciones para exponerlas más claramente.El material resultante de las descripciones fue también enviado para los profesores de patinaje del Estado do Rio Grande do Sul objetivando confirmar y realizar las consideraciones necesarias de las descripciones elaboradas. Todos los profesores estuvieron de acuerdo con las mismas y enumeraron los errores más comunes durante la ejecución de cada fase, posibilitando la formulación de la matriz de análisis del movimiento de deslizamiento. El modelo resultante de este estudio se presenta como la primera versión que posibilitará evaluaciones, y consecuentemente favorecerá las intervenciuones en el proceso pedagógico del aprendizaje en la habilidad de deslizarse. Palabras clave : deslizar, patinaje, matriz de análisis.

**CONSTRUÇÃO DE UMA MATRIZ PARA A ANÁLISE DO MOVIMENTO DE DESLIZAR COM PATINS DE RODAS: PRIMEIRA FASE**

**Resumo**

A habilidade de deslizar para frente é o primeiro movimento que deve ser aprendido e realizado para desenvolver os diferentes movimentos e regras peculiares das distintas modalidades que envolvem a patinagem. Para que o ensino-aprendizado dessa habilidade obtenha sucesso, dentre vários fatores, conhecer as características da habilidade tem grande importância, porque fornece parâmetros para a avaliação. Sendo assim, este trabalho teve como objetivo construir uma matriz de análise das características básicas da habilidade de deslizar para frente sobre patins de rodas. Na primeira etapa construiu-se um modelo descritivo da habilidade de deslizar para frente, a partir de observações do movimento em vídeos e campeonatos de patinação. As descrições foram estruturadas e divididas em: fase de execução I, que considerou o momento parado e de movimento da perna de impulsão mais o comportamento das partes do corpo de forma separada; fase de execução II, que observou a perna de deslize (do solo) e fase de execução III, sendo esse o momento do segundo impulso com a troca de perna. Após essa etapa, professores de Educação Física e patinação realizaram revisões e correções necessárias das descrições para que as mesmas obtivessem o máximo de clareza. O material contento as descrições também foi enviado para professores de patinação do Estado do Rio Grande do Sul objetivando confirmar e realizar considerações necessárias sobre as descrições elaboradas. Todos os professores concordaram com as descrições e enumeraram os erros mais comuns durante a execução de cada fase, possibilitando a formulação da matriz para a análise do movimento de deslizar. O modelo resultante deste estudo apresenta-se como uma primeira versão que possibilitará avaliações, e conseqüentemente favorecerá as intervenções no processo pedagógico de ensino-aprendizagem da habilidade de deslizar.

Palavras chaves: deslizar, patinação, matriz de análise

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