46 - PEAK OF ACCELERATION IN SCHOOL AGED 13 AND 14 YEARS IN THE RACE OF 75 METERS.

HENRIQUE ALEXANDRE PIURKOSKI, Ms FLÁVIO GUIMARÃES KALINOWSKI
UNIVERSIDADE ESTADUAL DE PONTA GROSSA – PARANÁ, BRASIL
Henrique_piurkoski@hotmail.com

INTRODUCTION

The race is one of the most common forms of human locomotion and instinctive apparently simple and easy to perform. However, when inserted into the sports scene, considered classic race in athletics, a gesture becomes more difficult and complex to be performed (DAL Pupo J., IC ROCK JR, CB Mota, 2007)

The technique of the race is one of the factors that most directly influence on the speed. Apart from some technical physical abilities directly influence the success of the movement ability (McFARLANE, 1987; CISSIK, 2004 apud ANDRÉS & SUELOTTO, 2010). The physical flexibility, allows the athlete to move the member to a maximum angle of the joint optimization required (CISSIK, 2004 apud ANDRÉS & SUELOTTO, 2010). Thus almost all measures of the mechanics of movement are affected by speed (Zatsiorsky 2004, p 125 apud NILSON et al. 1985; Federick Hagy & 1986; MERO & KOMI 1986, Munro et al. 1987).

A restriction of flexibility hinders the technique of the race. The physical strength to generate greater propulsion of the race, getting better results (SCHMOLINSKY, 1992 apud ANDRÉS & SUELOTTO, 2010). Thus, a low level of physical mentioned above becomes limiting in realizing the technique of the race.

In the scientific field, kinematic analysis, which describes how the parts of the body moves in space, is one of the most used to evaluate and analyze the technique of this sport athlete.

Thus, in an analysis from the beginning of the race the athlete's performance is related to factors such as the technical output of the starting block, amplitude and frequency of past, but it's pointless athlete's physical characteristics (length of legs and range of motion that has the hip) does not correspond with the race (Hay 1981).

On a more updated (Seagrave DICK 1996 and 2006, apud DAL Pupo, Geller, ROCK JR., MOTA, 2006) identify the stages in sprints. The first divides the 100 meters in 6 parts, excluding the heating and actions subsequent to arrival. They are: output, with the first two past; pure acceleration in 8-10 following past; transition, making connection to the next phase, the maximum speed; maintaining speed and final part, characterized by arrival.

The larger and longer the period of acceleration, the better the hallway. The world-class runners are able to maintain the positive acceleration phase by more than 50 meters. Comparing: runners that make up the route of the 100 meters in about 13 seconds, reach the end of their time acceleration after about 25 meters. The growing size stride to the maximum requires a longer time than the increase in frequency. Acceleration ends at the point where they reach maximum dimensions of the past, which differs from one individual to another, thus 85% of base speed is conditioned by the acceleration capacity (HOLLMANN & Hettinger, 1989, p. 270th).

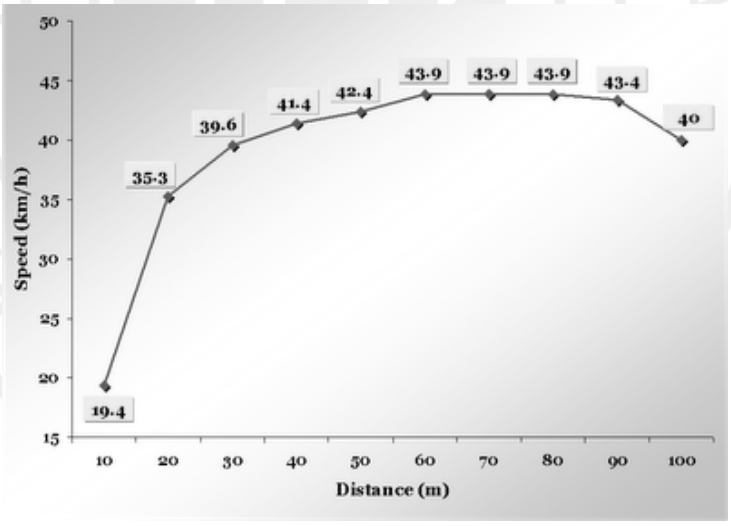


Figure 01: Curve Speed athlete Usain Bolt - Jamaica, at the Beijing Olympics 2008.
Font: The Science of Sport Magazine. R. TUCKER & J. Dugas

The acceleration of "sprint" speed depends crucially on both the basic and dynamic strength of the muscles used in their coordination, their contraction velocity, viscosity and anthropometric values available.

To Zatsiorsky (2004, p. 125) fast sprinters spend less time in contact with the ground during the period of support, mainly because they're running faster than the slowest sprinters.

There in the scientific, several studies regarding the speed races, translating models and forms of appropriate technical training, but only in adults. It must be noted a significant increase in the number of children and young people engaged in sports competitions, from the school level up to level competitions in Brazil federated.

Therefore this study aimed to analyze in which the distance was reached peak acceleration in students a final sporting event, in order to verify if the speed of athletics competitions are appropriate to the age of the athletes. In this context it can be argued that the evidence of speed could have a different distance of 75 meters.

So more research is needed in this audience. It is scientifically proven that children have different reactions and responses of adults in exercise because beings are still growing. Thus, should participate evidence consistent with their age group, providing efficiency in their movements biomechanical point of view (WILLIAN; GARRETT; Kirkendall, 2003 apud DAL Pupo, 2006).

MATERIALS AND METHODS

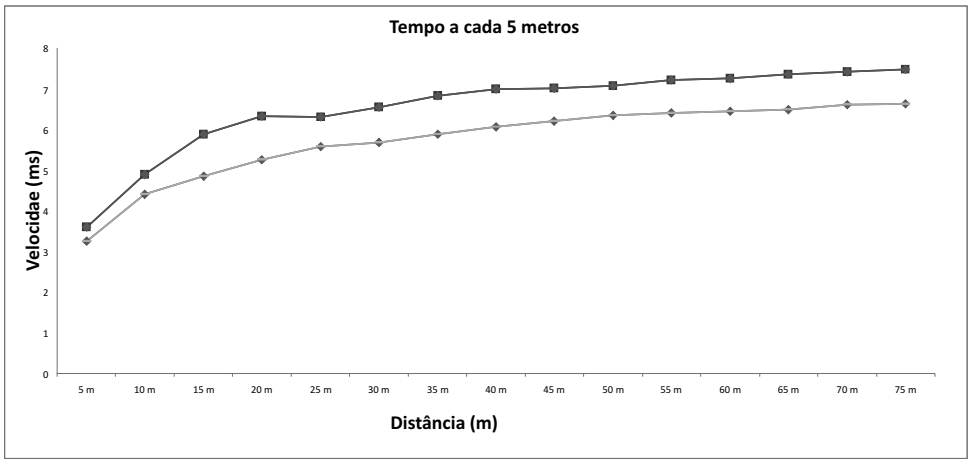
This survey had a sample size of 16 athletes schoolchildren in the region of the city of Ponta Grossa - Paraná, 8 males and 8 females, these competitors in the match racing final of the 75 meter dash Category Group I (with the track athletes age between 13 and 14 years) of the 56th Student Games Spring event organized by the State University of Ponta Grossa in September 2011.

For the analysis of proof was placed a video camera brand Panasonic Model Record No. AG-DVC20P - Mini DV - NTSC, at an approximate height of 2.20 meters with approximately 40 meters away from the track to 37 5 meters (halfway mark). 17 cones were placed every 5 meters arranged in parallel to track (lap 01) Campus of the State University of Ponta Grossa, and was used as a filming technique, called "panning", where a scan was performed on route 75 meters of the race.

With the aid of a "note book", using the "Windows Movie Maker", the evidence (male and female) were divided into two videos taking time to signal the beginning of the race referee's up to 10 feet beyond the finish line, there the speed of each athlete in meters per second (m / s) every 5 meters using as reference the athlete's chest crossing the mark cones. The results of analysis of the videos have been launched in the "Microsoft Office Excel 2003" and used to make graphical analysis of the results orientation.

RESULTS

Analyzing the results obtained with the sprinters, (Figure 02) it was found that the acceleration achieved a significant increase up to approximately 40 meters with average values of 6.98 m / s in boys and 6.06 m / s in girls later there was a slight increase in speed with the final values of 7.47 m / s 6.63 m / s respectively boys and girls.



* Boys more pronounced color / girls of color less pronounced

FIG. 02. The velocity curve in the proof of the 75-meter dash in boys and girls.

Font: State University of Ponta Grossa - UEPG, Sector Life Sciences and Health Ponta Grossa / PR, 2011.

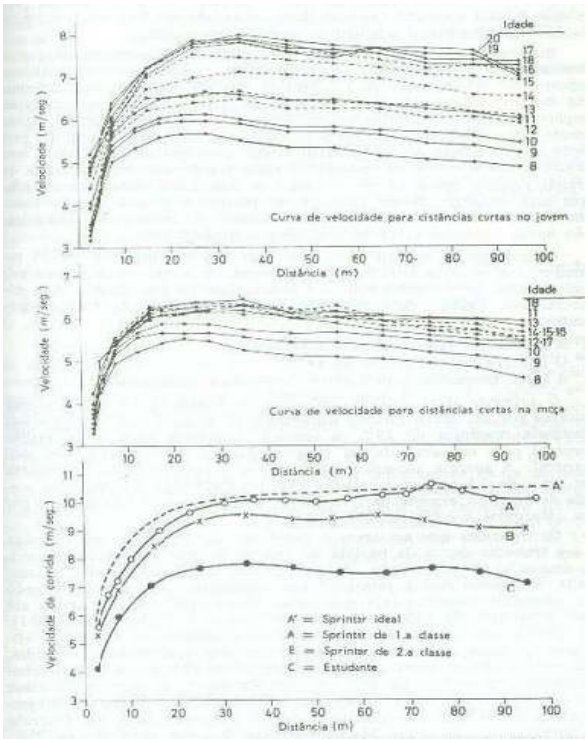


Fig 03. The velocity curve in the 100m sprint, the boys (above) and girls (center). Below a comparison of the velocity curve of a "Sprinter" first category (A), a "Sprinter" second class and a student PE (C) with an idealized curve (A').

Font: W. HOLLMANN Th & Hettinger, 1989.

DISCUSSION

According to the graphical analysis (Figure 02) presented earlier in this research demonstrated that the age group between 13 and 14 years the behavior of the velocity curve resembles results obtained by (HOLLMANN & Hettinger, 1989, p. 271) (Figure 03). Thus compare with evidence in the adult category where the peak acceleration is close to 60 meters, with 60% of the race the athletes of this age should run a distance of 66.60 meters at the most to make up the total route, explaining better considering the distances and calculations, it could be said that for these corridors 40 meters would be 60% of proof in this age group, with only 26.60 meters which would be 40% by the end of the race and not the 35 meters used by them to finish the race.

Following this line of reasoning these young athletes in the race 75 meters to reach the peak at 53% of the race still remaining approximately 47% of the race and trying to maintain speed by the end of the route.

To Claparède (1937 apud Weineck J, 2003) the child is not a miniature adult, and his mentality differs qualitatively and quantitatively from that of an adult, so that the child is not only smaller than the adult, but other than this.

In this perspective, it would be more coherent than the speed events for this age group should have a shorter distance. Whereas, to facilitate the operational actions in competitions, would be more appropriate to approximate the final distance to 65 meters with competitive order to check what would be the fastest athlete of proof.

CONCLUSION

After analysis and discussion of the results it was concluded that:

a) With respect to acceleration, the athletes had a progressive and more pronounced up to 40 meters and also between 40 and 75 meters the acceleration remained positive, however quite discreet.

b) In the analysis of the distances is possible to say that 40 meters would correspond to 60% of the race distance and the finish line should be in 66.60 meters.

SUGGESTIONS

The findings of the present study suggest that the most appropriate distance to see what the fastest athletes in the sprints, for this age group should cover the distance of 65 meters; however investigations would be needed with larger samples and still competitive at times, sequentially in progressive ages to be possible extrapolations of results.

REFERENCES

ANDRÉS J. M. P., SUELOTTO R. P. M., Ejecución de la técnica de la carrera, conocimiento teórico y de percepción de eficaica en niños de edad escolar en función de su edad cronológica. Cuadernos de Psicología del Deporte Dirección General de Deportes-CARM 2010. Vol 10, núm. 1. 71-80 Enero-Junio Facultad de Psicología ISSN: 1578-8423 Universidad de Murcia. Disponível em: http://dialnet.unirioja.es/servlet/dcfichero_articulo?codigo=3237273&orden=0> consultado em 26/09/2011.

DAL PUPO J., GHELLER R. G., ROCHA JR I. C., MOTA C. B., Diferenças na cinemática da corrida e na curva de velocidade em provas de 50 e 100 m rasos. Laboratório de Biomecânica – Universidade Federal de Santa Maria-UFSM – Santa Maria/RS. Disponível em: <http://www2.rc.unesp.br/eventos/educacao_fisica/biomecanica2007/upload/202-1-A-Artigo%20curva%20d%20velocid%20XII%20CBB.pdf> consultado em: 24/09/2011.

DAL PUPO J., ROCHA JR I. C., MOTA C. B., Correlações entre variáveis cinemáticas de crianças com distintos níveis técnicos em corridas de velocidade. Laboratório de Biomecânica – Universidade Federal de Santa Maria-UFSM – Santa Maria/RS, 2007. Disponível em: <http://www.scielo.oces.mctes.pt/pdf/rpcd/v7n1/v7n1a07.pdf> consultado em 25/09/2011.

HAY J.G. Biomecânica das técnicas desportivas. Rio de Janeiro: Interamericana, 1981.

HOLLMANN W. & HETTINGER Th., Medicina de esporte. Manole, 1989.

NASCIMENTO A. C. S. L., Pedagogia do esporte e o atletismo: considerações acerca da iniciação e da especialização esportiva precoce. Dissertação de mestrado, UNICAMP, 2005. Disponível em: http://www.aidachristine.com.br/livro.pdf consultado em 28/09/2011.

TUCKER R. & DUGAS J., Bolt's 9.69s. Analysis of speed during the world record. How fast did Bolt run?, The Science of Sport, 2008. Disponível em: http://www.sportsscientists.com/2008/08/beijing-2008-men-100m-race-analysis.html consultado em 02/05/2012.

WEINECK J. Treinamento ideal. São Paulo: Manole, 2003.

ZATSIORSKY V. M., Biomecânica no esporte performance do desempenho e prevenção de lesão. Guanabara, 2000.

Henrique Alexandre Piurkoski
Rua Nazaré, nº 37, Vila Americana
São Mateus do Sul
Paraná - CEP: 83.900.000
henrique_piurkoski@hotmail.com

PEAK OF ACCELERATION IN SCHOOL AGED 13 AND 14 YEARS IN THE RACE OF 75 METERS.

ABSTRACT

This research aims to analyze the velocity curve in competing school finalists in the sprint of the 75 meter dash of the 56th Games Student spring, participated in the experiment 16 athletes at school level the region of Ponta Grossa – Parana, Brazil, and eight athletes were male and eight female athletes aged between 13 and 14 years. To speed the analysis was performed with a camera filming a video of the Panasonic Model No. AG-DVC20P - Mini DV - NTSC using the method "panning" in the course of 75 meters, the video camera was positioned within 37.5 meters of the start of the race height of the ground 2.20 meters, with a distance of 40 meters from the race course, were placed 17 cones arranged every 5 meters of the race course. Later the images were edited in the PC and evaluated the velocity of the athletes at every 5 meters with precision in hundredths of time, using as reference the chest of the athlete to cross the lines of cones arranged on the race course. After analysis of the images were obtained the following results: that athletes of both sexes had a marked acceleration until about 40 meters with values of 6.08 m/s boys and 6.98 m/s girls, after this distance was a slight increase in acceleration until the end of the path 6.63 m / s girls and boys with 7.47 m / s. In this way related athletes in this study should go a distance of 66.60 meters, just 40 meters would be 60% of the race, leaving only 26.60 meters which would be 40% to finish the race. Considering the results suggest a distance of 65 meters for distance more appropriate to see what would be the fastest competitors in the sprint.

KEYWORDS: acceleration, athleticism, speed and 75 meters race.

LE PIC D'ACCÉLERATION CHEZ LES ÉCOLIERS ÂGÉS DE 13 ET 14 ANS DANS LE TEST DE SPRINT DE 75 MÈTRES

RÉSUMÉ

Cette recherche a comme but analyser la courbe de vitesse chez les compétiteurs écoliers finalistes de l'épreuve de vitesse du sprint de 75 mètres des 56º Jeux des Étudiants du Printemps, 16 athlètes de niveau scolaire de la région de la municipalité de Ponta Grossa – Paraná, Bresil, ont participé à l'expérience, étant 8 athlètes du genre masculin et 8 athlètes du genre féminin âgés de 13 et 14 ans. Pour l'analyse de vitesse a été réalisé un filmage avec une caméra vidéo de la marque Panasonic du modèle No.AG-DVC20P- Mini- NTSC en utilisant de la méthode « panning » le parcours des 75 mètres, la caméra vidéo est restée positionnée dans les 37,5 mètres du début de l´épreuve à une altitude du sol de 2,20 mètres, avec la distance de 40 mètres de la piste d'athlétisme, parallèle à la piste d'athlétisme, ont été mis 17 cones disposés à chaque 5 mètres du parcours de l´épreuve. Après, les images ont été éditées dans le programme PC, étant évaluées les vitesses des athlètes à chaque 5 mètres avec la précision du temps en centièmes, en utilisant comme référence la poitrine de l'athlète au croisement des lignes des cones disposés dans le parcours de l´épreuve. Après les analyses des images ont été obtenus les résultats suivants : les athlètes de tous les deux sexes ont eu une forte accélaration jusqu'à environ les 40 mètres avec des valeurs de 6,08 m/s les garçons et 6,98 m/s les filles, après cette distance il y a eu une discrète augmentation de l'accéleration jusqu'à la fin du parcours de 6,63 m/s les filles et les garçons avec 7,47 m/s. De cette manière les athlètes rapportés dans cette étude devraient parcourrir une distance maximale de 66,60 mètres, ainsi les 40 mètres seraient les 60% de l'épreuve, en restant seulement 26,60 mètres que seraient les 40% pour finir l´épreuve. En considérant les résultas on suggère une distance de 65 mètres pour la distance plus convenable pour vérifier quels seraient les compétiteurs plus rapides dans l'épreuve de vitesse.

MOTS-CLÉS : accéletarion, athlétisme, vitesse et épreuve de 75 mètres.

ACELERACIÓN MÁXIMA EN LOS NIÑOS DE LA ESCUELA CON EL FIN DE LA EDAD DE 13 Y 14 AÑOS EN LA PRUEBA DE 75 METROS.

RESUMEN

Esta investigación tiene como objetivo analizar la curva de velocidad en la prueba de la competencia escolar velocidad finalistas del tablero de 75 metros de los 56a Juegos de los Estudiantes de la Primavera, participó en el experimento 16 atletas de la escuela la región de la ciudad de Ponta Grossa - Paraná, 8 atletas varones y 8 atletas mujeres de edades comprendidas entre 13 y 14 años. Para el análisis de la velocidad se llevó a cabo una sesión de filmagen con una cámara de video Panasonic Modelo de Acta N º AG-DVC20P - Mini DV - NTSC utilizando el método "panning" de exploración de 75 metros, la cámara de vídeo se situado dentro de 37,5 metros de la carrera tempranas a una altura de 2,20 metros desde el suelo, con una distancia de 40 metros de la pista junto a la pista, se colocaron 17 conos colocados cada 5 metros de la ruta de la carrera. Más tarde, las imágenes fueron editadas en PC y evaluó la velocidad de los atletas de cada 5 metros con precisión en centésimas de tiempo, usando como referencia el pecho del atleta en cruzar la línea de conos dispuestos en el campo de regatas. Tras el análisis de las imágenes se obtuvieron los siguientes resultados: los atletas de ambos sexos tienen una fuerte aceleración de hasta aproximadamente 40 metros con valores de 6,08 m/s niños y niñas de 6,98 m/s, esta distancia se produjo después de una ligero aumento en la aceleración hasta el final de la ruta 6,63 m/s niños y niñas con 7,47 m/s. Así, los atletas que figuran en este estudio deben recorrer una distancia de 66,60 metros, a sólo 40 metros sería del 60% de la carrera, dejando sólo 26,60 metros, que es del 40% para terminar la carrera. Teniendo en cuenta los resultados sugieren una distancia de 65 metros de distancia más apropiada para comprobar cuáles serían los más rápidos competidores en la carrera por la velocidad.

PALABRAS CLAVE: aceleración, agilidad, velocidad y carrera de 75 metros

PICO DE ACELERAÇÃO EM ESCOLARES COM IDADE DE 13 E 14 ANOS NA PROVA DOS 75 METROS RASOS.

RESUMO

Esta pesquisa tem como objetivo analisar a curva de velocidade em competidores escolares finalistas da prova de velocidade dos 75 metros rasos dos 56º Jogos Estudantis da Primavera, participaram do experimento 16 atletas de nível escolar da região do município de Ponta Grossa - Paraná, Brasil, sendo 8 atletas do gênero masculino e 8 atletas do gênero feminino com idade entre os 13 e 14 anos. Para a análise da velocidade foi realizada uma filmagem com uma câmera de vídeo Panasonic de modelo No. AG-DVC20P - Mini DV - NTSC utilizando do método “panning” no percurso dos 75 metros, a câmera de vídeo ficou posicionada nos 37,5 metros do início da prova a uma altura do solo de 2,20 metros, com distância de 40 metros da pista de atletismo, paralelamente foram colocados cones a cada 5 metros do percurso. Posteriormente as imagens foram editadas em PC, sendo avaliadas as velocidades dos atletas a cada 5 metros com precisão do tempo em centésimos, utilizando como referencial o peito do atleta ao cruzar as linhas dos cones dispostos no percurso da prova. Após as análises das imagens foram obtidos os seguintes resultados: que os atletas de ambos os sexos tiveram uma aceleração acentuada até aproximadamente os 40 metros com valores de 6,08m/s meninos e 6,98 m/s meninas, após esta distância ocorreu um discreto aumento da aceleração até o termino do percurso 6,63 m/s as meninas e os meninos com 7,47 m/s. Desta forma os atletas relacionados neste estudo deveriam percorrer uma distância máxima de 66,60 metros, assim os 40 metros seriam os 60% da prova, restando apenas 26,60 metros que seriam os 40% para finalizar a prova. Considerando os resultados sugere-se uma distância de 65 metros para distância mais adequada para verificar-se quais seriam os mais velozes competidores na prova de velocidade.

PALAVRAS-CHAVE: aceleração, atletismo, velocidade e prova de 75 metros.