186 - GLUCOSE AND HEART RATE ANSWERS OF A PARACHUTE JUMP AND COMPARISON BETWEEN EXPERIENCED AND NOVICES

LUIS CLAUDIO MELO, ANTÔNIO CARLOS CARVALHO DE ALMEIDA; OSWALDO DIAS JR.
LAFIEX - Laboratório de Fisiologia do Exercício & Medidas e Avaliação -
Universidade Estácio de Sá, Rio de Janeiro, RJ/Brasil
luisclaudiomr@pop.com.br

Introduction:

What it is Parachute? It's a sport where someone jumps of an airplane in full flight conditions to at least the 3 thousand feet high (thousand meters), with a device that delay his fall in, more or less, about five minutes and they are carried him savef to the surface where his flight took off. After the landing, returns to the airplane to carry through again this same stupid thing.

Exist a sort of type competitions in parachute: that consist in jumps that aim at definitive maneuvers in performance, style, correction and time with the best possible merit of the competitors, either with the closed (Free Fly, Skysurf, Free Fall relative work and Free Style) or opened (Canopie Relative Work, Precision, Landing and Cross Country) parachute.

This in general is characterized for its forms of practises: sport, military, leisure and rescue. The sport versions and of leisure use, or not, an aircraft as conducting of the competitors who, in turn, use a double equipment for bigger security (in modality Canopie Relative Work a triple equipment was used because the risk that the competition offers). The military versions and of rescue only use aircraft as jump form, to reach places with hard access, or for accomplishment of special operations. To break of these two options it occurred the beginning and the diffusion of the parachute.

Some versions says that seven centuries ago Chinese tumblers used objects like guard sun to cushion their falls when they jumped from palaces or the Wall of China.

The parachute was drawn for the first time by Leonardo da Vinci where this says in his notes "if a man will make use a waterproofed cloth part having its covered pores with starch mass, and that he has ten fathoms of side and twelve of high, he can be shot of any height, without damages for itself". More than 500 years ago, in 1495, drew a rigid structure with the form of a pyramid. In 1595 Fausto Venânzio it describes another similar equipment to the one of da Vinci in its book "Machine Novae". But in 1617 he was the first man to jump of the tower of the Venice cathedral.

Although to be a relatively old sport still need a scientific search that it can be considered small on the activity, therefore each time more individuals look the sport stimulated by the increase in the search for radical sports, this for the beauty and for the "danger" it makes with that the individuals look it to defy itself exactly carrying through something that in his "head" is impracticable for majority of the population. This challenge makes with that its emotions are very strong in his head during the jump increasing all physiological answers to stress ambient and emotional intense.

In the dependence of this stimulate, either it physicist, psychological or biochemist, the organism reacts of form specifies, with adaptation of themselves or trying to adapt to this new bred situation.

The reply to stress it is a complex known mechanism as general syndrome of adaptation. According to his creator, the scientist Hans Selye, when one person is submitted to any stress, appears a series of conditions that makes possible support or face the aggression of the environment.

Albergaria(2006) says that the organic functions are controlled for two great systems interrelated between itself: the nervous system and the hormone system. As it acts by means of you substantiate you specify, and are important for the basic answers of the organism and for acute or chronic adaptations, associates with the training.

The catecolamins (Epinefrin and the norepinefrin) have its release due some factors, as in arduous exercise, with increasing exercise and at moments with strong psychological pressure (epinefrin) preparing the body for that known as reaction of fight or escape. This preparation makes with that person has a facilitation in likeable activity, rise of cardiac debits, the glycogen catabolism and, increase release acid greasy and the regulation of sanguineous vases for peripheral part (MCARDLE, KATCH & KACTH, 2003;MELO 2006;ALBERGARIA, 2006).

Objectives:

Because of this that study has as target verify what's going on with the Heart Rate and glycemic alterations accomplishment of a skydive jump and to compare the results between inexperienced and experienced skydivers.

Methodology:

It was a field study, being this in description way with comparative characteristics, therefore the data-collecting with purpose was abided to describe the results and to compare two objects of study according to Tomas and Nelson 1996.

The study counted with 5 adults of the masculine sort, in average age of 35,5 years, apparently healthful (ACSM 2000), Being 3 skydivers with more than 4100 jumps and 15 years old of practice with ages of 50, 35 and 31 years, and 2 pupils with ages of 28 and 25 years that will go to carry through his first jump during the tests, that sages of the evaluations the one that would be submitted, had signed a term of assented participation.

The research was carried through in the skydive area Skydive Resende®, located in the city of Resende, RJ. Where these had authorizeed the use of image and the name of the company. This area was chosen by being of easy access to the author.

For the measure of the heart rate was used a heart rate Polar® S610 model: In rest 24 hours before the accomplishment of the jump. Before the jump with the evaluated one dressing the equipment for accomplishment of the jump and where the rank of the equipment will be initiated the gauging after using the interface of polar with storage of frequency to each the 5 seconds, and finished after 10 minutes of landing.

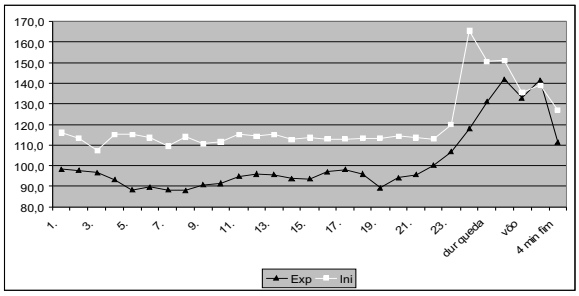
To Glucose a monitor of glucose Accutrend GCT Roche® and: 5 minutes before the accomplishment of the jump, 3o and 5o minute after the landing.

Results:

	Experienced	Novice	Test t	Results
Gluc Pré	**75 (22,1)**	**93 (43,8)**	**0,5710**	**equal**
Gluc 3'	**70,3 (50,5)**	**99 (24)**	**0,5229**	**equal**
Gluc 5'	**92,3 (24,9)**	**75,5 (34,6)**	**0,5649**	**equal**

When we analyze the average values sanguineous glucose we observe that, in that refers to the group of experienced individuals the alterations of the phases daily pay, for the 3 minute after comparing for the 5 minute the behavior corresponds to the literature how much to the effort (POLLOCK 1993) it wants either, falls of it I serve as apprentice daily pay for the pos and after increases 5 minutes of the jump. However, when we observe beginning the referring data to the waited o having as the theoretical parameters the values go up after the jump immediately (3º minutes) and fall of this secular for 5º minute. Probably, for the situation of stress great release of catecolaminas has occurred and provoked rise in the sanguineous glucose levels

Figure 1: Average of the HR of the experienced and beginning individuals in absolute values

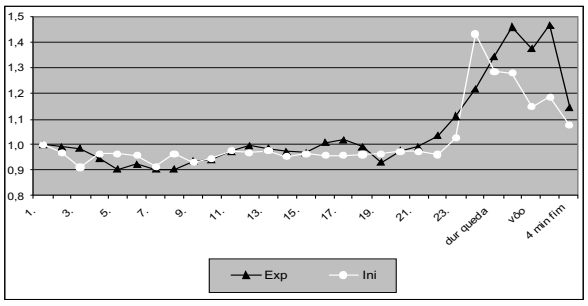


During all the procedure that involves the jump in itself, the beginning individuals had presented similar curves of reply modifying only the numerical values.

It can also be observed that the referring values to the experienced ones are minors who the referring ones to beginning, corroborating with research carried through, for Denzer; Kirschbaum; Gresele; Hellhammer (1997), Falk; Bar-eli (1995), Gauthier; Jouffray; Rodi; Gottesmann (1977), Jung; Schulze (1982) Roth; Breivik; Jorgensen; Hofmann (1996), that in its works they had shown that the experienced parachutists have the same answers that the beginning ones. However, in the absolute values of HR, this difference it occurs, therefore the beginning ones present a bigger average of HR that the experienced ones.

Figure 2 allows, in such a way, to identify them the referring results to the HR of the experienced ones how much of the beginning ones, comparing the results in percentage % based in 1º minute after the take-off of the airplane.

Figure 2: Comparison between measured after of the FC of experienced and beginning the normatização of the results for the FC of 1º the minute of the take-off in the airplane



Conclusions:

Observing the analyzed data it can be concluded that the two groups present seemed answers, but with absolute values of the beginning group bigger in relation to the one of the experienced ones, although not to occur estatistic significant differences between the two groups. However at some moments the FC percentile presented bigger values in the experienced group in relation to the beginning one. This difference occurs for the fact the experienced group have years of practical and, consequently bigger knowledge on the sport, having to the conscience that the moment were occur bigger risk is on the hour of the landing and when opens the parachute. This fact causes an exponential rise of the at the moment in question, despite the beginning ones presenting resulted bigger in absolute values.

A bigger number of citizens sends regards for this study that configure the sample, control of the daily food before the accomplishment of the jumps, to use differentiated sorts and analyzes sanguineous of the concentrations of epinefrin and norepinefrin of the individuals before and after the test.

Bibliography:

ADORNO, Ly. **Ser Pára-quedista.** Rio de Janeiro; Ed. Eletronica-Martins. Fotocomposição LTDA 1995

ALBERGARIA, Marcia. **Notas de aula.** 2006

AMERICAN COLLEGE OF SPORTS MEDICINE, ACSM, **Prova de Esforço e prescrição de exercício.** Rio de Janeiro; Ed. Revinter, 2000.

ANDRADE, Moacir C. Jr. **Aspectos Evolutivos dos Hormônios.** Arquivo Brasileiro Endocrinologia e Metabologia vol 46 nº 3 Junho 2002

ASTRAND, Per-Olof, **Text Book Of Work Physiology, Physiological Bases Of Exercise,** 4ª ed. Ed. Human Kinetics. 2003

CARPENTER, Carlos Sandro**. Treinamento Cardiorrespiratório**, Rio de janeiro: Sprint, 2002.

CORDEIRO, Célio, MELO, Luis, ALBERGARIA, Marcia. **Respostas Cronotrópicas e Inotrópicas Antes e Após a Apresentação de Monografia.** XXVIII Simpósio Internacional de Ciências do Esporte; São Paulo; 2005

COSTA, Fabiola, MELO, Luis C., ALBERGARIA, Marcia. **Correlação Entre o Comportamento das Respostas Cronotrópicas e Inotrópicas e a Constituição Morfológica de Atletas de Jiu-Jitsu.** XXVIII Simpósio Internacional de Ciências do Esporte; São Paulo; 2005

COSTA, Lamartine da, **Atlas do esporte no Brasil.** Rio de janeiro; Ed. Shape, 2005

DANTAS, E.H.M. **Manual do Soldado Pára-quedista.** Rio de Janeiro; Exercito Brasileiro,1977

DEINZER, R. KIRSCHBAUM, C., GRESELE, C., HELLHAMMER DH. **Adrenocortical Responses to Repeated Parachute Jumping and Subsequent H-CRH Challenge in Inexperienced Healthy Subjects.** Physiology & Behavior Volume 61, Pages 507-511 Issue 4 , USA; April 1997

DEROANNE, R., CESSION-FOSSION, A., JUCHMES, J., SERVAIS, J.C., PETIT, J.M., **Telemetric control of heart adaptation during automatic and free-fall parachute jumps.** Aviation, space, and environmental medicine. n° 46 Vol 2

p.128-31 USA; Feb;1975
DIAS, U.S, TUBINO, M.G. **Pára-quedismo: Diferenças Entre o Civil e o Militar.**Fitness & Performance Journal, Rio de Janeiro; V.4, N°3, p. 137- 144. Maio/Junho 2005
FALK, B., BAR-ELI, M. **The Psycho-Physiological Response to Parachuting Among Novice and Experienced Parachutists.** Aviation, space, and environmental medicine. n°66 Vol 2 p. 114-7. USA; Feb; 1995
GAUTHIER, P., JOUFFRAY, L., RODI, M., GOTTESMANN, C. **Radiotelemetric Study of Heart Rate and Electroencephalogram During Parachute Jumping.** Revue d'electroencephalographie et de neurophysiologie clinique. n°7 Vol 2 p. 219-24. France; Apr-Jun 1977.
GUYTON & HALL. **Tratado de Fisiologia Medica.** 9ª ed. Rio de Janeiro;Ed. Guanabara Koogan. 1996
HESPANHA, Raimundo. **Ergometria: Bases Fisiológicas e Metodologia Para a Prescrição do Exercício.** 1ª ed. Rio de Janeiro; Ed. Rubio. 2005
JUNG, K., SCHULZE, J. **Sports-Medical Studies on Parachute Jumpers With Particular Reference to the Behavior of Heart Rate.** Biotelemetry and Patient Monitoring. n°9 Vol 4 p.238-50; Switzerland; 1982
MCARDLE, William D.; KATCH, Frank I.; KATCH, Victon L. **Fisiologia do Exercício. Energia, Nutrição e Desempenho Humano**. 4ª. Ed. Rio de Janeiro; Ed. Guanabara Koogan, 1998.
MELO, Luis C., ALBERGARIA, Marcia. **Alterações da Freqüência Cardíaca e Pressão Arterial - Num Teste Maximo de Esteira Rolante, Realizado Por Alunos Universitários**. 10ª Jornada de Educacion Física del Mercosur;Jesus Maria, Córdoba, Argentina; 2005
MELO, Luis C., ALBERGARIA, Marcia. **Comparação das Variáveis Fisiológicas Entre Pára-quedistas Iniciantes e Experientes Estudo Piloto**. 10ª Jornada de Educacion Física del Mercosur;Jesus Maria, Córdoba, Argentina; 2005
MELO, Luis C., ALBERGARIA, Marcia. **Comparação Entre as Respostas Cronotrópicas Mensuradas em uma Apresentação Piloto e a Própria Apresentação de Monografia.** XXVIII Simpósio Internacional de Ciências do Esporte; São Paulo; 2005
MELO, Luis C.**Diferenças Cronotrópicas em Saltos Com e Sem Auxílio dos Membros Superiores Para Impulsão em um Trampolim Acrobático.** 20º Congresso Internacional de Educação Física - FIEP (Federation Internacionale D'education Physique);Foz do Iguaçu;2005
MELO, Luis C., ALBERGARIA, Marcia. **Respostas Cronotrópicas Durante Apresentação de Monografia.** XXVII Simpósio Internacional de Ciências do Esporte; São Paulo; 2004
POLLOCK, M.L.; WILMORE, J.H**. Exercícios na saúde e na doença**. Rio de Janeiro; Medsi.1993.
ROTH, W. T., BREIVIK, G., JORGENSEN, P.E., HOFMANN, S., **Activation in novice and expert parachutists while jumping.(1996).** Psychophysiology, n°33, Vol 1 p, 63-72. USA; Jan; 1996.
SANTOS, Marcello R., FILHO, José F., **Perfis Dermatoglífico, Somatotípico e das Qualidades Físicas Básicas dos Pára-quedistas do Exercito Brasileiro do Ano de 2003.** Fitness & Performance Journal, Rio de Janeiro; V3, N°2, p.88-99, Março/Abril 2004.
SCHEDLOWSKI, M. TEWES, U. **Physiological Arousal and Perception of Bodily State During Parachute Jumping.** Psychophysiology. n° 29 Vol 1 p. 95-103. USA; Jan; 1992
SIMÕES, Herbert Gustavo e Col. **Determinação do Limiar Anaeróbio por Meio de Dosagens Glicêmicas e Lactacidêmicas em Testes de Pista Para Corredores.** Revista Paulista de Educação Física, São Paulo, 12(1): 17-30, jan./jun. 1998.
STERLINI, G.L., BRYANT, R.A. **Hyperarousal and Dissociation: a Study of Novice Skydivers.** Behaviour Research and Therapy, n°4, Vol 40, p. 431-437, April 2002.
THATCHER J, REEVES S, DORLING D, PALMER A. **Motivation, Stress, and Cortisol Responses in Skydiving.** Perceptual and motor skills. n° 97 Vol 3 Pt 1 p. 995-1002. Dec; 2003
THEOPHILO, Marina, MELO, Luis C., ALBERGARIA, Marcia. **Diferenças Cronotrópicas Entre Homens e Mulheres em Saltos em um Trampolim Acrobático.** 20º Congresso Internacional de Educação Física - FIEP (Federation Internacionale D'education Physique);Foz do Iguaçu;2005
THOMAS, Jerry R., NELSON, Jack K.. **Research methods In Phisical Activity.** 3ª ed. Estados Unidos; Human Kinetics. 1996
WEINECK, Jurgen. **Manual do Treinamento Desportivo.** 2º ed. Rio de janeiro; Ed. Manole 1986.
WILMORE, Jack H.; COSTILL, David L. **Fisiologia do esporte e do exercício**, 2ª. ed. Rio de janeiro; Ed. Manole, 2001

LAFIEX- Campus Akxe - Universidade Estácio de Sá
Avenida Prefeito Dulcídio Cardoso 2900, Barra da Tijuca, CEP:22631-021, Rio de Janeiro, RJ, Brasil - Tel: 55 21 30895000 R.6040

GLUCOSE AND HEART RATE ANSWERS OF A PARACHUTE JUMP AND COMPARISON BETWEEN EXPERIENCED AND NOVICES

Abstract: The present research is a comparative and descriptive study that's intended to compare Heart Rate (HR) and glucose on sky divers with over 4100 jumps and first time sky dive students. Instrument: Glucose were measured before the jump and 3 and 5 minutes after landing. HR was measured through the whole period, beginning from 4 minutes before the departure, until the 10th minute after landing. The Student test T was used on independent data to verify the level of significancy in between both groups. With this, we intend to discuss the interferences in sky diving in these variables. Results shows an increase in all variables in first time sky dive students, with the exception of landing. If analyzed by percentage, the experience group shows higher results. HR levels are also similar during all moments but at the end of the jump.

Key-Words: Sky dive, Heart Rate, Glucose

RÉPONSES DE FRÉQUENCE DE GLUCOSE ET CARDIAQUE D'UN SAUT ET D'UNE COMPARAISON DE PARACHUTE ENTRE EXPÉRIMENTÉ ET LES DÉBUTANTS

Abrégé : La recherche actuelle est une étude comparative et descriptive qui est prévue pour comparer la fréquence cardiaque (heure) et le glucose sur des plongeurs de ciel plus de à 4100 sauts et étudiants de piqué de ciel de première fois. Instrument : Le glucose ont été mesurés avant le saut et 3 et 5 minutes après le débarquement. L'heure a été mesurée par toute la période, commençant de 4 minutes avant le départ, jusqu'à ce que la 10ème minute après le débarquement. L'essai T d'étudiant a été employé sur des données indépendantes pour vérifier le niveau du significancy entre les deux groupes. Avec ceci, nous avons l'intention de discuter les interférences dans la plongée de ciel dans ces variables. Les résultats montre une augmentation de toutes les variables dans des étudiants de piqué de ciel de première fois, excepté l'atterrissage. Si analysé par pourcentage, le groupe d'expérience montre des résultats plus élevés. Les niveaux d'heure sont également semblables pendant tous les moments mais à la fin du saut.

Mots-clés : Piqué de ciel, fréquence cardiaque, glucose

RESPUESTAS DEL RITMO CARDÍACO DE LA GLUCOSA Y DE UN SALTO Y DE UNA COMPARACIÓN DE PARACAÍDAS ENTRE EXPERIMENTADO Y LOS PRINCIPIANTES

Extracto: La actual investigación es un estudio comparativo y descriptivo que se piensa para comparar el ritmo cardíaco (hora) y la glucosa en zambullidores del cielo con sobre 4100 saltos y estudiantes de la zambullida del cielo de la primera vez. Instrumento: La glucosa fue medida antes del salto y de 3 y 5 minutos después de aterrizar. La hora fue medida con el período entero, comenzando a partir de 4 minutos antes de la salida, hasta que el 10mo minuto después de aterrizar. La prueba T del estudiante fue utilizada en datos independientes para verificar el nivel del significancy entre ambos grupos. Con esto, nos preponemos discutir las interferencias en el salto del cielo en estas variables. Los resultados demuestran un aumento en todas las variables en estudiantes de la zambullida del cielo de la primera vez, a excepción del aterrizaje. Si es analizado por porcentaje, el grupo de la experiencia demuestra resultados más altos. Los niveles de la hora son también similares durante todos los momentos pero en el final del salto.

Palabras claves: Zambullida del cielo, ritmo cardíaco, glucosa

RESPOSTAS CRONOTRÓPICAS GLICEMICAS DECORRENTES DA REALIZAÇÃO DE UM SALTO DE PÁRA-QUEDAS E COMPARAÇÃO ENTRE NOVATOS E EXPERIENTES

Resumo: Nos últimos anos, vem ocorrendo um crescente aumento pela busca de esportes ditos radicais. Por esse crescente aumento alguns indivíduos que trabalham nessa área vão em busca de referencias para ter não apenas o respaldo psicológico do esporte (liberdade, juventude, etc.) e sim um respaldo cientifico do que realmente ocorre com o corpo do mesmo durante a pratica dessas atividades e saber se com o tempo de pratica esses indivíduos adquirem certo "treinamento" (adaptação) a essas mudanças, é elas são minimizadas. O pára-quedismo e um exemplo de esporte que e bastante procurado, mas por ser de grande despesa por necessitar de materiais caros e específicos não e tão praticado e nem tanto estudado. Sabe-se que o ritmo sinusal do coração pode ser alterado por fatores extrínsecos representados pela ação do Sistema Nervoso Autônomo e das catecolaminas. De acordo com Costill e Wilmore (2001) e Melo(2006), a ação do Sistema Nervoso simpático é responsável por aumentar a freqüência cardíaca, a força de contração do miocárdio e a liberação das catecolaminas e predomina durante situações de estresse físico e emocional. Powers e Howley (2000), relacionam esta ação do Sistema Nervoso simpático à hipótese desenvolvida por Cannon, onde este sistema prepararia o indivíduo para enfrentar ou fugir de um perigo iminente. Os mesmos autores evidenciam a resposta cardiovascular elevada durante períodos pré-exercício ou durante exercícios submáximos realizados em atmosfera emocionalmente carregada, quando comparado a ambiente psicologicamente neutro. **Objetivo:**Verificar as respostas cronotrópicas e glicemicas entre pára-quedistas novatos e experientes. . **Metodologia:** O estudo foi descritivo com características comparativas. a amostra foi composta 5 indivíduos adultos do gênero masculino, na faixa etária de 35,5 anos, aparentemente saudáveis (ACSM 2000), Sendo 3 praticantes de pára-quedismo com mais de 4100 saltos e 15 anos de pratica com de idades de 50, 35 e 31 anos , e 2 alunos com idades de 28 realizando seu 1° salto **Resultados:** Observou-se a resposta glicemica esperadad na literatura quando se diz respeito ao experiente e ivertendo a situação quando observamos. As curvas de FC são similares durante o período, apenas diferenciando-se no momento final do salto.