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Original Article Abstract

Select One:					
Coordinated Skiing	Managing the Centre of Mass	Changing Direction / Turning	Sliding- control of speed and stopping	Adaptation/ Familiarization	Specific consideration in children

Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE	**Injuries among children and adults in alpine skiing and snowboarding**
Author(s):	Arne Ekeland , Andreas Rødven , Stig Heir
Publication Details (add citation and DOI number)	Ekeland A, Rødven A, Heir S. Injuries among children and adults in alpine skiing and snowboarding. J Sci Med Sport. 2019 Aug;22 Suppl 1:S3-S6. doi: 10.1016/j.jsams.2018.07.011. Epub 2018 Jul 31. PMID: 30100170.

ABSTRACT

To compare the prevalence of injury sites between children and adults in alpine skiing and snowboarding. The injuries occurring in 14 major Norwegian ski resorts were recorded by ski patrols the winter seasons 2010/2011 and 2011/2012. The injuries were related to age, equipment and other factors. A total of 1603 injured children ≤12years and 3202 injured adults ≥20years were recorded. The prevalence of shoulder injuries was twice as high in adults as in children both in alpine skiers (14% vs. 7%) (p<0.001) and snowboarders (20% vs. 10%) (p<0.001). Also the prevalence of knee injuries were higher for adults than for children in skiing (30% vs. 22%) (p<0.001) as well as in snowboarding (8% for vs. 4%) (p=0.009). Both the prevalence of snowboarding wrist injuries and skiing lower leg fractures were higher among children than adults (32% vs. 18%, p<0.001 and 12.6% vs. 3.6%, p<0.001 respectively). More children than adult skiers suffered their injuries in terrain parks with 18% vs. 13% (p<0.001). In contrast, more adult than child snowboarders (36% vs. 26%) (p=0.007) suffered their injury in terrain parks. The prevalence of shoulder and knee injuries was higher in adults than in children both in skiing and boarding. In contrast, the prevalence of snowboarding wrist injuries and skiing lower leg fractures were higher in children than in adults. More children than adult alpine skiers suffered their injury in terrain parks, whereas the reverse was observed for snowboarders.

Conclusions and Implications for practice:

Children's skeleton has more cartilage and collagen. Their bones have lower ability to sustain forces and can bear less. The rate and frequency of lower extremity fractures is much higher in children than in adolescents, especially under the age of 7 !

Selected Bibliography (follow-up):

Deibert MC, Aronsson DD, Johnson RJ, Ettlinger CF, Shealy JE. Skiing injuries in children, adolescents, and adults. J Bone Joint Surg Am. 1998 Jan;80(1):25-32. PMID: 9469305.

Forestier-Zhang L, Bishop N. Bone strength in children: understanding basic bone biomechanics. Arch Dis Child Educ Pract Ed. 2016 Feb;101(1):2-7.

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Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Children's thermoregulation during exercise in the heat: a revisit**
Author(s):	Bareket Falk, Raffy Dotan
Publication Details (add citation and DOI number)	Falk B, Dotan R. Children's thermoregulation during exercise in the heat: a revisit. Appl Physiol Nutr Metab. 2008 Apr;33(2):420-7. doi: 10.1139/H07-185. PMID: 18347699

ABSTRACT

The review revisits some child-adult differences relevant to thermoregulation and offers alternatives to accepted interpretations. Morphologically, children have a higher body surface area to mass ratio -- a major factor in "dry" heat dissipation and effective sweat evaporation. Locomotion-wise, children are less economical than adults, producing more heat per unit body mass. Additionally, children need to divert a greater proportion of their cardiac output to the skin under heat stress. Thus, a larger proportion of their cardiac output is shunted away from the body's core and working muscles -- particularly in hot conditions. Finally, under all environmental conditions and allometric comparisons, children's sweating rates are lower than those of adults. The differences appear to suggest thermoregulatory inferiority, but no epidemiological data show higher heat-injury rates in children, even during heat waves. We suggest that children employ a different thermoregulatory strategy. In extreme temperatures, they may indeed be more vulnerable, but under most ambient conditions they are not necessarily inferior to adults. Children rely more on dry heat dissipation by their larger relative skin surface area than on evaporative heat loss. This also enables them to evaporate sweat more efficiently with the added bonus of conserving water better than adults.

Conclusions and Implications for practice:

Children are more vulnerable during extreme conditions, hot but also including cold weather. Head to body size ratio in children is much larger than in adults. As we lose almost 25% of body heat through the skin's blood vessels on our head, it is advisable that children keep their head covered when cold, even when not skiing, e.g. during the breaks.

Selected Bibliography (follow-up): McDaniel L. Hypothermia and Cold Injury in Children. Pediatr Rev. 2022 Jan 1;43(1):58-60. doi: 10.1542/pir.2021-004975.

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Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Ultraviolet radiation oxidative stress affects eye health**
Author(s):	Iliya V Ivanov , Timo Mappes , Patrick Schaupp , Christian Lappe , Siegfried Wahl
Publication Details (add citation and DOI number)	Ivanov IV, Mappes T, Schaupp P, Lappe C, Wahl S.. J Biophotonics. 2018 Jul;11(7):e201700377. doi: 10.1002/jbio.201700377. Epub 2018 Apr 24. PMID: 29603665.

ABSTRACT	*If publication is in other than English language – the English abstract must be provided.	**ABSTRACT**

In the eye, ultraviolet radiation (UVR) is not known to contribute to visual perception but to mainly damage multiple structures. UVR carries higher energy than visible light and high dose exposure to UVR causes direct cellular damage, which has an important role in the development of cancer. This review provides an overview on the most recent knowledge on the role of UVR in oxidative stress (OS) in relation to noncancer ocular pathologies: various corneal pathologies, cataract, glaucoma and age-related macular degeneration. Possible OS signaling streams and mechanisms in the aging eye are discussed. Excessive exposure to UVR through live may seriously contribute to increase in OS of various eye tissues and thus lead to the advancement of serious ocular pathologies. Children are especially vulnerable to UVR because of their larger pupils and more transparent ocular media: up to 80% of a person's lifetime exposure to UVR is reached before the age of 18. Therefore, efficient everyday protection of the sensitive tissues of the eye by wearing of sunglasses, clear UVR-blocking spectacles or contact lenses should be considered from early age on. Many initiatives are taken worldwide to inform and raise the population's awareness about these possible UVR hazards to the eye.

Conclusions and Implications for practice:

Childrens eyes are more sensitive, and they should wear sunglasses form an early age

Selected Bibliography (follow-up):

Walsh JE, Bergmanson JP. Does the eye benefit from wearing ultraviolet-blocking contact lenses? Eye Contact Lens. 2011 Jul;37(4):267-72. doi: 10.1097/ICL.0b013e3182235777. PMID: 21670694.

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Select One:					
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**	
TITLE:	**Current principles of sunscreen use in children**				
Author(s): Nicola A Quatrano , James G Dinulos					
Publication Details (add citation and DOI number)	Quatrano NA, Dinulos JG.. Curr Opin Pediatr. 2013 Feb;25(1):122-9. doi: 10.1097/MOP.0b013e32835c2b57. PMID: 23295720.				
ABSTRACT					

Purpose of review: Physicians need to be prepared to counsel patients on why and how to protect themselves from damaging ultraviolet (UV) radiation, including the proper use of sunscreens. In this article, we review the interplay between UV radiation, sunscreens and the skin, highlighting current controversies and recommendations surrounding sunscreen use.
Recent findings: An important concept is that excessive UV exposure has long-term damaging effects on the skin beyond the immediate sunburn. Recent discoveries of the role of UVA radiation in skin cancer development have set high standards for broad-spectrum coverage to be met by sunscreens. Current evidence does not support an association between sunscreen use and melanoma, systemic toxicity or vitamin D deficiency. Although sunscreen application is the most common modality for sun protection, many people do not use it correctly. Regular sunscreen use during childhood and adolescence can significantly reduce lifetime incidence of skin cancer; therefore, targeting children in pediatric offices regarding unprotected UV exposure may be a practical approach.
Summary: Sunscreens continue to be a major method of photoprotection among the public, offering numerous benefits that clearly outweigh potential risks; however, optimizing the use of sunscreens, especially among children and adolescents, remains a major challenge.

Conclusions and Implications for practice:

Children have thinner skin (especially epidermis) which provides less protection, and they produce less melanin, so they have a higher risk of sunburn. Sun protection for children should be against UVA and UVB rays and a minimum of SPF30 applied probably every 2 hours

Selected Bibliography (follow-up): Stechschulte SA, Kirsner RS, Federman DG. Sunscreens for non-dermatologists: what you should know when counseling patients. Postgrad Med. 2011 Jul;123(4):160-7. doi: 10.3810/pgm.2011.07.2315. PMID: 21681000.

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Select One:					
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**	
TITLE:	**Strength training for children and adolescents**				
Author(s): Faigenbaum A.					
Publication Details (add citation and DOI number)	Faigenbaum A. (2000) Strength training for children and adolescents. Clinics in Sports Medicine 19, 593-619				
ABSTRACT					
The potential benefits of youth strength training extend beyond an increase in muscular strength and may include favorable changes in selected health- and fitness-related measures. If appropriate training guidelines are followed, regular participation in a youth strength-training program has the potential to increase bone mineral density, improve motor performance skills, enhance sports performance, and better prepare our young athletes for the demands of practice and competition. Despite earlier concerns regarding the safety and efficacy of youth strength training, current public health objectives now aim to increase the number of boys and girls age 6 and older who regularly participate in physical activities that enhance and maintain muscular fitness. Parents, teachers, coaches, and healthcare providers should realize that youth strength training is a specialized method of conditioning that can offer enormous benefit but at the same time can result in serious injury if established guidelines are not followed. With qualified instruction, competent supervision, and an appropriate progression of the volume and intensity of training, children and adolescents cannot only learn advanced strength training exercises but can feel good about their performances, and have fun. Additional clinical trails involving children and adolescents are needed to further explore the acute and chronic effects of strength training on a variety of anatomical, physiological, and psychological parameters.					
Conclusions and Implications for practice:					
Loading the children with ski equipment will not do harm to their growing bones and cause epiphyseal fractures. It is proven that children can demonstrate significant gains in muscle strength with resistance training					
Selected Bibliography (follow-up): Jeffreys I, Micheli LJ, Nitka M, Rowland TW. Youth resistance training: updated position statement paper from the national strength and conditioning association. J Strength Cond Res. 2009 Aug;23(5 Suppl):S60-79. doi: 10.1519/JSC.0b013e31819df407. PMID: 19620931.					

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Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Anaerobic and aerobic enzyme activities in human skeletal muscle from children and adults**
Author(s): Jan J Kaczor , Wieslaw Ziolkowski, Jerzy Popinigis, Mark A Tarnopolsky	
Publication Details (add citation and DOI number)	Kaczor JJ, Ziolkowski W, Popinigis J, Tarnopolsky MA. Anaerobic and aerobic enzyme activities in human skeletal muscle from children and adults. Pediatr Res. 2005 Mar;57(3):331-5. doi: 10.1203/01.PDR.0000150799.77094.DE.

ABSTRACT

Literature has shown that children have lower anaerobic capacity and oxidize more lipids during aerobic activity compared with adults. The purpose of the present study was to examine the effects of age on the activity of marker enzymes for anaerobic and aerobic metabolism in human skeletal muscle from relatively sedentary children and adults. The m. obliquus internus abdominis was analyzed for anaerobic [creatine kinase, adenylate kinase, and lactate dehydrogenase (LDH)] and aerobic (carnitine palmitoyltransferase and 2-oxoglutarate dehydrogenase) enzyme activities in 32 male individuals. The subjects were divided into two groups: children (3-11 y; n=20) and adults (29-54 y; n=12). LDH activity was higher in adults (118.2 +/- 20.1) compared with children (27.8 +/- 10.1) micromol.min(-1). g(-1) wet weight ($p < 0.0002$). Creatine kinase activity was 28% ($p < 0.0003$) lower in children than in adults and adenylate kinase activity was 20% ($p < 0.006$) lower in children than in adults. In addition, we found higher 2-oxoglutarate dehydrogenase activity in adults compared with children ($p < 0.04$), with no effect of age on carnitine palmitoyltransferase activity (NS). When samples were expressed relative to protein content, only LDH activity remained significantly lower in children compared with adults ($p < 0.0001$). In conclusion, the lower LDH activity observed in children compared with adults may partially explain decreased anaerobic and lactate generation capacity of the children studied. However, the mechanisms for the relatively deficient anaerobic enzyme activities of children are not clear.

Conclusions and Implications for practice:

Children have lower anaerobic power and a 2- to 3-fold lower blood lactate concentration after exercise when compared with adults but equal activity of aerobic endurance energy pathways!
It seems that overtraining in children would happen more often psychologically and there is no reason to copy the training process of adult athletes.

Selected Bibliography (follow-up): Armstrong N., Welsman J. (2002) Young people and physical activity. Oxford University Press, Oxford

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Coordinated Skiing	Managing the Centre of Mass	Changing Direction / Turning	Sliding- control of speed and stopping	Adaptation/ Familiarization	Specific consideration in children

Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Ski Sickness in Adolescents Skiers**
Author(s): Reza Alizadeh; Vahid Ziaee, Ziba Aghsaei-Fard; Mehrab Hojat	
Publication Details (add citation and DOI number)	Alizadeh R; Ziaee V, Aghsaei-Fard Z; Hojat M.Ski Sickness in Adolescents Skiers Iran J Pediatr. Dec 2009; Vol 19 (No 4), Pp:409-412

ABSTRACT

Objective: There is shortage of knowledge about medical problems in adolescent skiers. This study aimed to determine frequency of medical signs and symptoms during or after ski among adolescents' skiers. Methods: This cross-sectional study was performed in 12 consecutive weekends in winter 2005 at Dizin ski resort in Iran. All adolescent skiers (<16years) who had entered the resort during this time period were enrolled in the study. A questionnaire including demographics, duration of transport to the resort, wearing glasses and contact lenses for medical and non-medical applications, duration and frequency of skiing and development of signs and symptoms of ski sickness during or after skiing was filled for each participant. In addition, association of mentioned variables with medical problems was investigated. Findings: Of 162 skiers, 111 subjects (68.5%) were males. The mean age of the participants was 14.7±2.1 years. Of them, 1 2 7 skiers wore glasses or lens during skiing. Visual disorders including myopia, hyperopia and astigmatism were found in 24 (14.8%) skiers. Our study showed that the frequency of main ski-related signs and symptoms varies from 0 to 10.5%. There was significant association between occurrence of signs and symptoms and presence of visual disorder (P=0.015).Conclusion: Our results showed that development of ski-related signs and symptoms is relatively frequent. These signs and symptoms have association with minor ophthalmologic problems such as myopia or astigmatism.

Conclusions and Implications for practice:

Children and adolescents tend to develop motion sickness („ski sickness" or Hausler disease) in fog more often. Sight disturbances (astigmatism and shortsightedness) are major risk factors.Ski teachers should closely look for signs of disorientation, visual disturbances and dizziness, especially if accompanied by fear.

Selected Bibliography (follow-up): Häusler R. Ski sickness. Acta Otolaryngol. 1995 Jan;115(1):1-2. doi: 10.3109/00016489509133337. PMID: 7762376.

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Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Kids With Altitude: Acute Mountain Sickness and Changes in Body Mass and Total Body Water in Children Travelling to 3800 m**

Author(s):
Matt Rieger , Isabel Algaze , Adriana Rodriguez-Vasquez , Kurt Smith , Mike Stembridge , Brianne Smith , Shlomit Radom-Aizik , Alison McManus

Publication Details (add citation and DOI number)
Rieger M, Algaze I, Rodriguez-Vasquez A, Smith K, Stembridge M, Smith B, Radom-Aizik S, McManus A. Kids with Altitude: Acute Mountain Sickness and Changes in Body Mass and Total Body Water in Children Travelling to 3800 m. Wilderness Environ Med. 2022 Mar;33(1):33-42. doi: 10.1016/j.wem.2021.11.001

ABSTRACT

Introduction: We explored the incidence of acute mountain sickness (AMS) and extravascular lung water (ELW) in children in relation to changes in body composition and peripheral blood oxygenation (SpO2) during 1 week of acclimatization to 3800 m.
Methods: In a prospective cohort study, 10 children (7 female, ages 7-14 y) and 10 sex-matched adults (ages 23-44 y) travelled via automobile from sea level to 3000 m for 2 nights, followed by 4 nights at 3800 m. Each morning, body mass and body water (bioelectrical impedance), SpO2 (pulse oximetry), AMS (Lake Louise Questionnaire), and ELW (transthoracic echocardiography) were measured.
Results: No differences were found between children and adults in SpO2 or ELW. At 3800 m 7 of 10 children were AMS+ vs 4 of 10 adults. Among those AMS+ at 3800 m, the severity was greater in children compared to adults (5±1 vs 3 ± 0; P=0.005). Loss of body mass occurred more quickly in children (day 5 vs day 7) and to a greater extent (-7±3% vs -2±2%; P<0.001); these changes were mediated via a larger relative loss in total body water in children than in adults (-6±5% vs -2±2%; P=0.027).
Conclusions: Children demonstrated a higher incidence of AMS than adults, with greater severity among those AMS+. The loss of body water and body mass at high altitude was also greater in children, albeit unrelated to AMS severity. In addition to awareness of AMS, strategies to maintain body weight and hydration in children traveling to high altitudes should be considered

Conclusions and Implications for practice:

It seems that some children adapt to high altitude with more problems and higher occurrence of acute mountain sickness, especially when they are younger than 13y. Children do not realize hypoxia and will report early signs later. Some proved that children had a higher risk of altitude sickness even when sleeping below 2000m.Ski teachers should monitor for headache signs or nausea.

Selected Bibliography (follow-up): de Meer K, Heymans HS, Zijlstra WG. Physical adaptation of children to life at high altitude. Eur J Pediatr. 1995 Apr;154(4):263-72.

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Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	E A Koller , A Bührer, L Felder, M Schopen, M B Vallotton
Author(s): Altitude diuresis: endocrine and renal responses to acute hypoxia of acclimatized and non-acclimatized subjects.	
Publication Details (add citation and DOI number)	Koller EA, Bührer A, Felder L, Schopen M, Vallotton MB. Altitude diuresis: endocrine and renal responses to acute hypoxia of acclimatized and non-acclimatized subjects. Eur J Appl Physiol Occup Physiol. 1991;62(3):228-34. doi: 10.1007/BF00643747. PMID: 2044531.

ABSTRACT

As a result of our recently published studies we have thought that altitude diuresis resulting from hypoxic stimulation of the arterial chemoreceptors reduces the cardiac volume overload. To test this hypothesis, cardiovascular, endocrine and renal responses to stepwise acute exposure to simulated altitude (6,000 m) were compared in ten acclimatized recumbent mountaineers a mean of 24 days, SD 11, after descending from Himalayan altitudes of at least 4,000 m, with those found in ten non-acclimatized recumbent volunteers. The results showed that natriuresis and diuresis typified the renal responses to altitude exposure of both the acclimatized as well as non-acclimatized subjects, as long as altitude was well tolerated. It was concluded that the renal effects were mediated by atrial natriuretic peptide release and slight suppression of arginine-vasopressin (AVP) secretion, that the increased urine flow at altitude offset the cardiac (volume) overload resulting from hypoxic stimulation of the arterial chemoreceptors, and that enhanced AVP secretion, as found in the non-acclimatized subjects at and above 4,000 m, coincided with subjective and objective distress, i.e. with inadequate altitude adjustment owing to insufficient chemoreflex effects and central hypoxia.

Conclusions and Implications for practice:

As altitude triggers mechanisms that lead to diuresis (peeing) and as children's bodies have more water, it is not surprising that even if they peed at a previous cable car station, you can always expect the need for diuresis again

Selected Bibliography (follow-up): Haditsch B, Roessler A, Hinghofer-Szalkay HG. Renal adrenomedullin and high altitude diuresis. Physiol Res. 2007;56(6):779-787. doi: 10.33549/physiolres.931032. Epub 2006 Nov 6. PMID: 17087599.

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Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Physiology of growth and development. Its relationship to performance in the young athlete**
Author(s): J N Roemmich , A D Rogol	
Publication Details (add citation and DOI number)	Roemmich JN, Rogol AD. Physiology of growth and development. Its relationship to performance in the young athlete. Clin Sports Med. 1995 Jul;14(3):483-502. PMID: 7553919.

ABSTRACT

Proper grouping of children for sports is important for injury prevention and for fair competition. We have reviewed several of the classification systems presently used as well as the physiologic underpinnings of pubertal growth and development and the accrual of strength and power. It is during adolescence that the greatest physiologic differences exist mainly because of the wide variations in the timing and tempo of the pubertal growth spurt in normally growing boys and girls. Maturity-based categorization, especially in contact and collision sports, would heighten the competition and lessen rates of injury.

Conclusions and Implications for practice:

The strength and endurance of boys and girls is essentially the same until puberty, the differences start to appear around the age of 11 only post-puberty, strength is much higher for boys than for girls. By the age of 15 years, boys were around 12% stronger than girls in their lower body

Selected Bibliography (follow-up):

Armstrong N., Welsman J. (2002) Young people and physical activity. Oxford University Press, Oxford
Bassett AJ, Ahlmen A, Rosendorf JM, Romeo AA, Erickson BJ, Bishop ME. The Biology of Sex and Sport. JBJS Rev. 2020 Mar;8(3):e0140. doi: 10.2106/JBJS.RVW.19.00140. PMID: 32224635.

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Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**	

TITLE:	**The healthfulness and prominence of sugar in child-targeted breakfast cereals in Canada.**
Author(s): Monique Potvin Kent , Cher Cameron , Sarah Philippe	
Publication Details (add citation and DOI number)	Potvin Kent M, Cameron C, Philippe S. The healthfulness and prominence of sugar in child-targeted breakfast cereals in Canada. Health Promot Chronic Dis Prev Can. 2017 Sep;37(9):266-273. doi: 10.24095/hpcdp.37.9.02. PMID: 28902476

ABSTRACT

The objective of this study was to compare the nutritional content and healthfulness of child-targeted and "not child-targeted" breakfast cereals and to assess the predominance of added sugar in these products.We collected data on the nutritional content of 262 unique breakfast cereals found in the five largest grocery store chains in Ottawa (Ontario) and Gatineau (Quebec). We noted the first five ingredients and the number of added sugars present in each cereal from the ingredients list. The various cereal brands were then classified as either "healthier" or "less healthy" using the UK Nutrient Profile Model. We assessed each cereal to determine if it was child-targeted or not, based on set criteria. Statistical comparisons were made between child and not child-targeted cereals. 19.8% of all breakfast cereals were child-targeted, and these were significantly lower in total and saturated fat. Child-targeted cereals were significantly higher in sodium and sugar and lower in fibre and protein, and were three times more likely to be classified as "less healthy" compared to not child-targeted cereals. No child-targeted cereals were sugar-free, and sugar was the second most common ingredient in 75% of cereals. Six breakfast cereal companies had child-targeted product lines that consisted entirely of "less healthy" cereals. There is a need for regulations that restrict food marketing to children and youth under the age of 17 on packaging to reduce their appeal to this age group. Children's breakfast cereals also need to be reformulated through government-set targets, or through regulation should compliance be deemed unacceptable.

Conclusions and Implications for practice:

There is a significantly higher sugar content in cereals advertised to children compared to generic cereals Food with a high glycemic food index triggers a high insulin response and leads to a strong hunger within only 2h. Try to include some protein (eggs, unsweetened yoghurt) or raw cereals for breakfast and then let them have carbohydrates for lunch to replenish glycogen stores in the muscles and liver

Selected Bibliography (follow-up): Germer S, Hilzendegen C. Sugar content of German breakfast cereals for children - recommendations and reality, Ernahrungs Umschau, 2013

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Select One:				
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	**Physiological / medical**

TITLE:	**Physical activity at altitude: challenges for people with diabetes**
Author(s): Pieter de Mol , Suzanna T de Vries , Eelco J P de Koning , Reinold O B Gans , Henk J G Bilo , Cees J Tack	
Publication Details (add citation and DOI number)	de Mol P, de Vries ST, de Koning EJ, Gans RO, Bilo HJ, Tack CJ. Physical activity at altitude: challenges for people with diabetes: a review. Diabetes Care. 2014 Aug;37(8):2404-13.

ABSTRACT

Background: A growing number of subjects with diabetes take part in physical activities at altitude such as skiing, climbing, and trekking. Exercise under conditions of hypobaric hypoxia poses some unique challenges on subjects with diabetes, and the presence of diabetes can complicate safe and successful participation in mountain activities. Among others, altitude can alter glucoregulation. Furthermore, cold temperatures and altitude can complicate accurate reading of glucose monitoring equipment and storage of insulin. These factors potentially lead to dangerous hyperglycemia or hypoglycemia. Over the last years, more information has become available on this subject.Purpose: To provide an up-to-date overview of the pathophysiological changes during physical activity at altitude and the potential problems related to diabetes, including the use of (continuous) blood glucose monitors and insulin pumps. To propose practical recommendations for preparations and travel to altitude for subjects with diabetes.Data sources and synthesis: We researched PubMed, medical textbooks, and related Internet sites, and extracted human studies and data based on relevance for diabetes, exercise, and altitude. Limitations: Given the paucity of controlled trials regarding diabetes and altitude, we composed a narrative review and filled in areas lacking diabetes-specific studies with data obtained from nondiabetic subjects. Conclusions: Subjects with diabetes can take part in activities at high, and even extreme, altitude. However, careful assessment of diabetes-related complications, optimal preparation, and adequate knowledge of glycemic regulation at altitude and altitude-related complications is needed.

Conclusions and Implications for practice:

Do not start a ski day without fast acting glucose tablets in your pocket (and child's pocket as well) and even consider emergency glucagone injections. Replenish carbohydrates during breaks. Never let a diabetic child use a chairlift alone, especially not after a strenuous run.

Selected Bibliography (follow-up): Matejko B, Gawrecki A, Wróbel M, Hohendorff J, Benbenek-Klupa T, Malecki MT, Zozulińska-Ziółkiewicz D, Klupa T. Type 1 Diabetes at High Altitude: Performance of Personal Insulin Pumps and Patient Metabolic Control. Diabetes Technol Ther. 2017 Oct;19(10):600-602. doi: 10.1089/dia.2016.0452.

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Original Article Abstract

Select One:					
Coordinated Skiing	Managing the Centre of Mass	Changing Direction / Turning	Sliding- control of speed and stopping	Adaptation/ Familiarization	Specific consideration in children
Select One:					
Psycho- social	**Educational (Pedagogical)**	**Biomechanical**	**Motoric (Motor Control)**	Physiological / medical	

TITLE:	**How do you approach seizures in the high-altitude traveller**
Author(s): Edward H Maa	
Publication Details (add citation and DOI number)	Maa EH. How do you approach seizures in the high-altitude traveller? High Alt Med Biol. 2011 Spring;12(1):13-9. doi: 10.1089/ham.2010.1071. PMID: 21452959.

ABSTRACT

Counselling patients who suffer first-time or break- through seizures can be difficult, particularly when controllable external factors may be contributing to the lowering of their seizure threshold. High altitude as a potential trigger for seizures is a common question in our epilepsy clinics in Colorado, and this article reviews the existing anecdotal literature, presents our local experience with high altitude seizures (HAS), offers possible mechanisms to explain how high altitude may trigger seizures, and suggests an initial work-up and prophylactic strategies for future high-altitude exposures.

Conclusions and Implications for practice:

Downhill skiing is categorized as a moderate risk for a child with epilepsy. A child who suffers from frequent attacks may really be at risk while skiing, especially when using ski lifts or ski near unprotected cliffs or canyons. No anticonvulsants guarantee a 100% freedom from seizures. In case the child has been free from seizures for a long time and parents would like to enrol the child into ski school, talk to the ski school manager about protocols. In any case use a helmet and darker sunglasses as even bright light may provoke seizures. Avoid slopes with objects like trees and similar. Cross country skiing is usually safer and a much recommended alternative.

Selected Bibliography (follow-up): Nakken KO. Physical exercise in outpatients with epilepsy. Epilepsia. 1999 May;40(5):643-51. doi: 10.1111/j.1528-1157.1999.tb05568.x.

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TITLE:	**Asthma ski day: cold air sports safe with peak flow monitoring**
Author(s): W Silvers , M Morrison, M Wiener	
Publication Details (add citation and DOI number)	Silvers W, Morrison M, Wiener M. Asthma ski day: cold air sports safe with peak flow monitoring. Ann Allergy. 1994 Aug;73(2):105-8.

ABSTRACT

The Colorado Asthma Ski Day, an annual cross-country and alpine skiing event, encourages children with asthma to participate fully in outdoor winter sports. Since cold air and exercise can trigger bronchospasm, we examined the peak expiratory flow rates of 80 children who attended Asthma Ski Day 1992 or Asthma Ski Day 1993 to establish a safety profile for this event. Peak expiratory flow rates were measured prior to skiing, at lunchtime, and at the end of the day's activities. We asked the children to pretreat with their regular medications, as prescribed by their physicians, to use their bronchodilator inhalers p.r.n., and to report to our medical station if an episode of acute asthma occurred. The average age of the participants was 9.5 years, and the average baseline daytime peak flow rate was 100.03% of predicted. The average percent change in peak flow rates during the day was an increase of 5.00%. Our results demonstrate that with medical supervision, peak expiratory flow rate monitoring, and properly administered medications, peak flow rates can be stabilized and even improve during cold-weather exercise to an extent that safety concerns need not restrict children with asthma from engaging in exercise or cold-weather sports. The Colorado Asthma Ski Day can serve as a model event for other organizations that want to promote outdoor activities for children with asthma.

Conclusions and Implications for practice:

Asthma can be triggered by many things depending on the type of asthma - and cold air and higher altitude are also among those reasons. The first exposure should be closely monitored as cold air and skiing might trigger exercise induced bronchospasm. If asthma is well managed (using long term therapy) still pay attention to slower execution of warm up/cool down exercises. Do ensure the child (and you) have a bronchodilator on the slope but use it only as advised by the parents or an MD. Peek flowmeter device may be useful but not obligatory.

Selected Bibliography (follow-up): Driessen JM, van der Palen J, van Aalderen WM, de Jongh FH, Thio BJ. Inspiratory airflow limitation after exercise challenge in cold air in asthmatic children. Respir Med. 2012 Oct;106(10):1362-8. doi: 10.1016/j.rmed.2012.06.017.

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TITLE:	**Basal Mild Dehydration Increase Salivary Cortisol After a Friendly Match in Young Elite Soccer Players**
Author(s): Mauricio Castro-Sepulveda , Rodrigo Ramirez-Campillo , Felipe Abad-Colil , Camila Monje , Luis Peñailillo , Jorge Cancino , Hermann Zbinden-Foncea	
Publication Details (add citation and DOI number)	Castro-Sepulveda M, Ramirez-Campillo R, Abad-Colil F, et al. Basal Mild Dehydration Increase Salivary Cortisol After a Friendly Match in Young Elite Soccer Players. Front Physiol. 2018;9:1347

ABSTRACT

A soccer match induces changes in physiological stress biomarkers as testosterone (T), cortisol (C), and testosterone: cortisol (T:C) ration. Hydration state may also modulate these hormones, and therefore may alter the anabolic/catabolic balance in response to soccer match. The role of hydration status before the match in this biomarker has not yet been reported. The aim of this study was to compare the salivary T, C, and the T:C ratio responses after two friendly matches in well-hydrated and mild-dehydrated (MD) elite young male soccer player. Seventeen players (age, 16.8 ± 0.4 years; VO2max 57.2 ± 3.6 ml/kg-1/min-1) were divided into two teams. Before the matches the athletes were assessed for hydration level by the urine specific gravity method and divided for the analysis into well-hydrated (WH; n = 9; USG < 1.010 g/mL-1) and mild-dehydrated (MD; n = 8; USG 1.010 to 1.020 g/mL-1) groups. Hormones were collected before and after each match by saliva samples. The mean (HRmean) and maximal (HRmax) heart rate were measured throughout the matches. A two-way ANOVA was used to compare T, C, and T:C between and within groups. Similar HRmean (WH, 83.1 ± 4.7%; MD, 87.0 ± 4.1; p = 0.12) and HRmax (WH, 93.2 ± 4.4%; MD, 94.7 ± 3.7%; p = 0.52) were found for both groups during the matches. No differences were found before the matches in the T (p = 0.38), C (p = 66), nor T:C (p = 0.38) between groups. No changes within groups were found after matches in neither group for T (WH, p = 0.20; MD, p = 0.36), and T:C (WH, p = 0.94; MD, p = 0.63). Regarding the C, only the MD group showed increases (28%) after the matches (MD, p = 0.03; WH, p = 0.13). In conclusion MD group exacerbate the C response to friendly matches in elite young male soccer players, suggesting that dehydration before match may be an added stress.

Conclusions and Implications for practice:

Children's' bodies have more water content and losing 3% might lead to stress, induced by dehydration. Higher stress is related to higher cortisol levels and may lead to higher injury rates. Because of altitude diuresis (peeing) they are very susceptible to dehydration.

Selected Bibliography (follow-up): Aerenhouts D, Chapelle L, Clarys P, Zinzen E. Hydration Status in Adolescent Alpine Skiers During a Training Camp. J Hum Kinet. 2021 Jul 28;79:55-63. doi: 10.2478/hukin-2021-0062.