
**LABORATORY FOR
HUMAN PERFORMANCE STUDIES**

BIOMECHANICS

EXERCISE PHYSIOLOGY

HUMAN GROWTH AND DEVELOPMENT

MOTOR LEARNING

ANNUAL REPORT 1982

UNIVERSITY OF CALGARY, CANADA

Director:	NIGG, Benno M.	Dr.sc.nat. Professor	Biomechanics
Secretary:	FOOFAT, Marjorie		
Associates:	HAWES, Michael	Ph.D. Associate Prof.	Human Growth
	KERR, Barry	Ph.D. Associate Prof.	Biomechanics Motor Learning
	SMITH, David	Ph.D. Associate Prof.	Physiology
	NIIMIMAA, Veli	Ph.D. Associate Prof.	Physiology
	BUZZELL, Nancy	M.Sc. Instructor	Biomechanics
	Technicians:	FISHER, Veronica	B.A.
BEAUCHAMP, Louise		M.Sc.	Part-time
BURRETT, James		B.Sc.	Part-time
NEIL, Rosie			
TORY, Byron			
POLISCHUK, Darren			
Ph.D. Students:	LUETHI, Simon	Medicine	Biomechanics
	WRONKO, Craig	Medicine	Biomechanics
	ATTINGER, Delphini	Medicine	Biomechanics
	SCHLAEPFER, Fridl	Mech.Eng.	Biomechanics

PUBLICATIONS

Author	Title	Journal
# Niqq, B.M. Denoth, J. Neukomm, P.A.	Quantifying the load on the human body: problems and solutions.	In: Biomechanics VII. A. Morecki, K. Fidelus, K. Kedzior and A. Wit (Eds.) Baltimore: University Park Press, 1981, pp. 88-99.
# Denoth, J. Wigg, B.M.	The influence of various sport floors on the load on the lower extremities.	In: Biomechanics VII. A. Morecki, K. Fidelus K. Kedzior and A. Wit (Eds.). Baltimore: University Park Press, 1981, pp. 100-105.
# Seuesser, A. Neukomm, P.A. Niqq, B.M. Ruegg, P. Troxler, G.	Force measuring system for the take-off in ski jumping.	In: Biomechanics VII. A. Morecki, K. Fidelus K. Kedzior and A. Wit (Eds.). Baltimore: University Park Press, 1981, pp. 478-482.
Niqq, B.M. Bell, G.D. Kiefer, G.N. Luethi, S.M. Schachar, N.S.	A quantitative assessment of the asymmetry of locomotion parameters in subjects with chronic anterior cruciate ligament injuries.	In: Human Locomotion II. J.G. Redi, T. Bryant, S. Olney, B. Smith, J. Stevenson and R. Walmsley (Eds.) Kingston, Ontario, 1982, pp. 9-11.
Niqq, B.M. Luethi, S. Seuesser, B. Stacoff, A. Guidon, H.W. Schneider, A.	Sportchuhkorrektur. Ein biomechanischer Vergleich von drei verschiedenen Sportchuhkorrektur {Sport shoe support inlays. A biomechanical comparison of three different types of arch support.	Z. Orthop. 120: 34-39, 1982.
Nigg, B.M.	Kinder im Leistungssport - einige biomechanische Überlegungen (Children in high performance sport - some biomechanical considerations).	In: Kinder im Leistungssport. H. Howald and E. Hahn (Eds.). Basel: Birkhaeuser Verlag, 1982, pp. 60-65.

Author	Title	Journal
Nigg, B.M.	Perspectives in Biomechanics applied to sport and Physical Education.	In: Biomechanics: Principles and application. R. Huiskes, D. Van Campen and J. De Wijn (Eds). Boston: Nijhoff, 1982, pp. 19-30.
Nigg, B.M.	Biomechanical testing in sports.	Sport science periodical on research and technology in sport pp. 1-9, 1982.
Kinnear, G.R. Kerr, B.A. Fisher, V. Beauchamp, L. Smerek, P.A.	A Bicycle Ergometer for High Altitude Investigations.	Can. J. Appl. Spt. Sci. 7:1 55-57, 1982
Niinimäki, Veil	Figure Skating: What do we know about it?	The Physician and Sportmedicine 10; 51-56
Smith, D.J. Wenger, H.A.	The ten day aerobic mini- cycle: The Effects of interval or continuous training at two different intensities.	Journal of Sport-medicine. Vol 21: No. 4. pp. 390-394. December, 1981.
Smith, D.J. Quinney, H.A. Steadward, R.D. Wenger, H.A. Sexsmith, J.R.	Physiological Profiles of the Canadian Olympic Hockey Team.	Can. J. Appl. Sport Sci. Vol. 7:2 142-146. 1982

Due to political reasons, these three publications only were available in Spring, 1982. However, they are officially dated for 1981 but have not been mentioned in the last Annual Report.

P R E S E N T A T I O N S

Month	Topic and Location	Author
January	Perspectives in Biomechanics applied to Sport and Physical Education. Keynote lecture at the Third Meeting of the European Society of Biomechanics in Nijmegen.	Nigg, B.
January	Load, Sport Shoes and Playing Surfaces. Invited lecture at the Symposium on Biomechanical properties of Sport Shoes and Playing surfaces in Nijmegen.	Nigg, B.
January	"Movement in Tennis" lecture Adidas, France.	Nigg, B.
January	"Physiological Considerations for X-Country Ski Training Programs". X-Country Ski Symposium, Edmonton.	Smith, D.
March	Weight Training for Football. University of Calgary Football Conference. Calgary.	Smith, D.
May	The Knee: Trauma and Sports Injury. Invited lecture at the Sixteenth Annual Mackid Lecture and Seminars, Calgary General Hospital.	Nigg, B.
May	Quantification of Medication by Biomechanical Parameters, and Jogging Biomechanics. Two invited lectures at the Mayo Clinic, Rochester	Nigg, B.
July	Methodological Aspects in Biomechanics with Respect to Swinging. Keynote lecture at the International Conference of Biomechanics and Medicine in Swimming in Amsterdam.	Nigg, B.
September	A Quantitative Assessment of the Asymmetry of Locomotion Parameters in Subjects with Chronic Anterior- Cruciate Ligament Injuries. Keynote lecture, Bi-annual Conference of the Canadian Society for Biomechanics in Kingston, Ontario.	Nigg, B.

Month	Topic and Location	Author
October	Biomechanics in Sport Invited Keynote Lecture, CASS Meeting Victoria, B.C.	Nigg, B.
October	Interrelationships between Anaerobic Power Indices and Selected Isokinetic Peak Torque Measure. CASS Meeting, Victoria.	Smith, D.
October	Some Biomechanical Aspects of Transportation of Subjects with Ski Injuries. Banff.	Luethi, S.
October	Biomechanical Aspects of Load on the Musculo-skeletal system during Alpine Skiing. Banff.	Nigg, B.
October	Influence of Exercise on Body Sway in the Standing Rifle Shooting Position. CASS Meeting, Victoria.	Niinimaa, V.

ATTENDANCES AT SCIENTIFIC CONFERENCES (without presentation)

Month	Location	Attending
October	ASB Meeting, Seattle	Luethi, S. Wronko, C. Schlaepfer, F. Attinger, F.
May	ACSM, Minneapolis	Smith, D. Nigg, B.
June	Biochemistry of Exercise, Boston	Smith, D.
October	Canadian Society for Psychomotor Learning and Sports Psychology, Edmonton.	Kerr, B.A.
December	Endurance Physiology, A.M.J.A. Honolulu, Hawaii	Kerr, B.A.

INTERNAL REPORTS

Author	Title	
Bahlsen, A. Burrett, J. Nigg, B.	Influence of muscle tension on the impact force peak. (Experiments with a model).	June
Nigg, B. Fisher, V.	Influence of footwear on oxygen cost in running.	June
Luethi, S. Nigg, B.	Some biomechanical aspects of transportation of subjects with ski injuries	Oct
Luethi, S. Wronko, C. Nigg, B.	Cushioning in tennis shoes.	Dec
Schlaepfer, F. Nigg, B.	Friction in tennis shoes	Dec
Attinger, D. Bahlsen, A. Nigg, B.	Control in tennis shoes	Dec

OFFICIAL FUNCTIONS

Committee	Name
President elect of the International Society of Biomechanics.	Nigg, B.
Review Committee, Health and Welfare Canada Committee No. 51	Nigg, B.
University Research Policy and Grants Committee. University of Calgary	Nigg, B.
Technology Transfer Strategy Committee University of Calgary	Nigg, B.
Faculty Council, Faculty of Medicine. University of Calgary.	Nigg, B.
Alberta Fitness Certification Program	Smith, D.

P R O J E C T S

Title	Investigators
Biomechanical aspects of anterior-cruciate ligament injuries	Niqq, B. Luethi, S. Bahlsen, A. Neil, R. Kiefer, G. Fisher, V. Beauchamp, L.
Etiology of discomfort, pain and injuries in tennis.	Niqq, B. Hawes, M. Luethi, S. Bullard, J. Fisher, V. Beauchamp, L.
Development of a test battery for tennis shoe analysis.	Niqq, B. Attinier, D. Bahlsen, A. Luethi, S. Schlaepfer, F. Wronko, C.
Foot contact in running as a function of speed	Kerr, B. Beauchamp, L.
Blood Analysis of Swimmers	Smith, D. Fisher, V.
Biomechanics of the spine	Schlaepfer, F. Nigg, B.
Teacher-Class Interaction	Lucas, G. Fisher, V.
Competition and Family Position	Kerr, B.A. Lashuk, M. Fisher, V.
Swimming: film-analysis to determine the speed variation of elite swimmers vs. non-elite swimmers	Niqq, B. Beauchamp, L. Bahlsen, A.
Sportshoe film	Beauchamp, L-
Software development for PDP-11/44 (force)	Burrett, J. Byron, T. Polischuk, D. ,

FITNESS AND ANTHROPOMETRIC EVALUATION

Team	Investigators
Calgary Flames Professional NHL Hockey Team	Smith, D. Fisher, V. Beauchamp, L. Niinimaa, V. Luethi, S. Wronko, C. Bahlsen, A.
Alberta Amateur Hockey Players	Beauchamp, L. Fisher, V.
University of Calgary Hockey Team	Luethi, S.
University of Calgary Swim Club	Smith, D. Fisher, V.
University of Calgary Volleyball Team (Women)	Smith, D. Wronko, C. Fisher, V. Nigg, B.
National Downhill Ski Team	Beauchamp, L. Fisher, V.
Biathlon - West Canadian National Team	Niinimaa, V.
National Speed Skating Team	Smith, D. Wronko, C.

A C A D E M I C G U E S T S

Guest	From	Contact Person(s)
Philip Proctor, Ph.D.	Biomechanics Laboratory, ETH Zurich, Switzerland	Niqa, B. Luethi, S.
Edgar Stuessl Dr.	Director, Biomechanics Laboratory, ETH, Zurich	Niqa, B. Luethi, S.
Alex Stacoff	Research Department Adidas, France.	Niqa, B. Luethi, S.
Ron Zernicke, Ph.D.	U.C.L.A., Los Angeles, U.S.A.	Nigg, B.
Norman Schachar M.D.	Calgary General Hospital, Calgary	Nigg, B.
Ned Frederick Ph.D.	Director, NIKE, Research and Development, Exeter, U.S.A.	Nigg, B.
Heikki Ikola	National X-Country Team, Finland.	Niinimaa, V.
J.A. Scott Kelso	Haskins Laboratories and University of Connecticut	Kerr, B.A.

EQUIPMENT

COMPUTER

PDP-11/44	with	1 RA-80 121 Mbyte disc drive 2 RX-02 Floppy disc drives 1 LPA-11-KK data acquisition system 1 LA-120 printer 1 LA-34 printer 1 TS-11 tape drive 3 VT-100 terminals 1 VT-125 terminals (graphics) 1 HP 7221C graphics plotter 1 graphics printer Unix operation system with Fortran, Pascal and C languages. (Multi-use system)
PDP-11/23	with	2 RX-02 floppy disc drives 1 VT-105 graphics terminal
HP 9845B	with	1 Digitizer HP 9874 1 Projection head Vanguard used as film analysis system.

MEASURING SYSTEMSBiomechanics and Physiology

- 2 Locam Cameras (up to 500 frames per sec)
- 1 Super 8mm Camera
- 1 Kistler Force Platform (60 x 90 cm)
- 2 Goniometers triaxial (Medex)
- 3 Accelerometers Endevco
- 10 photocells
- 1 Treadmill
- 1 Beckman medical gas analyser LB-2
- 1 Beckman Oxygen analyser OM-11
- 1 Beckman metabolic measurement cart
- 1 Cybex 11
- 1 EMG system
- 1 Medilog Ambulatory monitoring system
- 1 Beckman M-42 Spectrophotometer
- 1 Sorvall RT6000 refrigerated centrifuge
- 5 Narco physiographs.
- 6 Monark ergometer.

Motor Learning

Dekan Performance Analyzer
Lafayette White Noise Generator
Lafayette Master Shocker
Lafayette Bassin Anticipation Timer
Lafayette Reaction Time Apparatus, with .001 Timers
Lafayette Knee Reflex Reaction Timer
Lafayette Stabilometer

Additional Equipment

1 Tektronics 511A oscilloscope (8-channel)
2 Oscilloscopes
2 Narco Biotelemetry transmitters and receivers.

