

Session #1**Moore Hall - Room 100****Sport: Shoes/Running/Landing**

Chairs: Michiyoshi Ae (Japan) - Vitold Yurkevich (USSR)

- 11:00 CHANGES IN THE MATERIAL PROPERTIES OF RUNNING SHOES DUE TO SHOE WEAR - **J.E. Jones & K.R. Williams** (140)
- 11:15 PRESSURE DISTRIBUTION PATTERNS INSIDE OF A RUNNING SHOE DURING UP- AND DOWNHILL RUNNING - **T.L. Milani & E.M. Hennig** (306)
- 11:30 ELASTIC ENERGY IN ATHLETIC SHOE CUSHIONING SYSTEMS - **M.R. Shorten** (120)
- 11:45 TIBIAL BONE ACCELERATION AND GROUND REACTION FORCE PARAMETERS DURING RUNNING - **E.M. Hennig & M.A. Lafortune** (226)
- 12:00 THE RELATIONSHIP BETWEEN TECHNIQUE & GROUND REACTION FORCES AT LANDING IN NETBALL - **J.R. Steele & M.A. Lafortune** (243)
- 12:15 TORSIONAL MOVEMENT OF THE FOOT DURING LANDING - **A. Stacoff, X. Kalin & E. Stussi** (77)

Session #2**Ackerman 2nd Floor Lounge****Simulation and Modeling**

Chairs: Robert Jensen (Canada) - Wieslaw Musial (Poland)

- 11:00 A COMPUTER GRAPHIC SYSTEM TO STUDY HUMAN MOVEMENT - **S. Delp, F. Zajac, D. Delp & P. Loan** (169)
- 11:15 THE ROLE OF THE CORACOCALVICULAR MECHANISM IN THE MOTION PATTERN BETWEEN SCAPULA AND CLAVICLE - **G.M. Pronk & F.C.T. van der Helm** (327)
- 11:30 INTERNAL SHOULDER FORCES DUE TO AN EXTERNAL LOAD - **D. Karlsson, B. Peterson, C. Hogfors & P. Herberts** (392)
- 11:45 SIMULATED TEAM BOAT ROWING USING MECHANICALLY COUPLED WIND RESISTANCE ERGOMETERS - **W.L. Bauer** (54)

Session #3**Haines Hall - Room 39****Muscle Function: Isokinetic Function**

Chairs: A.E. Joo (Singapore) - Mark Grabiner (USA)

- 11:00 STRETCH REFLEX RESPONSES OF THE HUMAN M. TRICEPS SURAE FOLLOWING MECHANICAL STIMULATION - **A. Gollhofer, D. Schmidtbleicher** (219)
- 11:15 ABDOMINAL AND HIP FLEXOR MUSCLE INVOLVEMENT IN VARIOUS TRAINING EXERCISES - **E. Andersson, Z. Ma, J. Nilsson & A. Thorstensson** (254)
- 11:30 3D MUSCLE ACTIVATION SURFACES - LINEAR RELATIONSHIPS - **R.N. Marshall, S.M. Mazur & N.A.S. Taylor** (182)
- 11:45 ISOKINETIC TORQUE EXPRESSED RELATIVE TO KNEE VERSUS LEVER ARM ANGLE - **E.B. Colliander & P.A. Tesch** (337)

Session #4**Morgan Center Press Room****Tissue: Bone**

Chairs: Ariel Simkin (Israel) - Clinton Rubin (USA)

- 11:00 THE FRACTURE PROPERTIES OF CORTICAL BONE IN THOROUGHBRED RACEHORSES: RACECOURSE DESTRUCTION CASES COMPARED WITH NORMAL BONES - **G.P. Evans, J.C. Behiri, L.C. Vaughan & W. Bonfield** (62)
- 11:15 AN ANALYSIS OF TRABECULAR BONE MICRO-MECHANICS USING HOMOGENIZATION THEORY WITH COMPARISON TO EXPERIMENTAL RESULTS - **S.J. Hollister, D.P. Fyhrie, K.J. Jepsen & S.A. Goldstein** (110)
- 11:30 THE RELATIONSHIP BETWEEN DENSITY AND STIFFNESS OF LONG BONE - **E. Stuessi, J. Denoth & S. Luethi** (126)
- 11:45 INTERACTIVE EFFECTS OF NUTRITION, ENVIRONMENT, AND RAT-STRAIN ON CORTICAL AND VERTEBRAL BONE GEOMETRY AND BIOMECHANICS - **R.F. Zernicke, A.C. Vailas, R.E. Grindeland, K-C. Li, G.J. Salem** (368)
- 12:00 STRENUOUS EXERCISE EFFECTS ON MECHANICAL PROPERTIES AND GEOMETRY OF WEIGHTBEARING VS NONWEIGHT-BEARING MATURE BONES - **A.C. Vailas, R.F. Zernicke, B.J. Loitz, K. McCranie, Martinez** (264)

Session #1

Moore Hall - Room 100

Sport: Cycling

Chairs: Annie Rouard (France) - Peter Hollander (Holland)

- 1:30 THE INFLUENCE OF INDIVIDUAL MOVEMENT PATTERN ON COORDINATIVE EFFICIENCY IN ROAD CYCLING - **V. Zschorlich** (307)
- 1:45 FORCE MEASUREMENTS IN COMPETITIVE CYCLING WITH A MOBILE EQUIPMENT - **G. Bergmaier**, F. Hediger, M. Marki (207)
- 2:00 DESIGN VALIDATION AND USE OF TWO INDOOR-OUTDOOR SPROCKET-MOUNTED CYCLING COMPUTERS FOR EVALUATION AND MODIFICATION OF PEDALING TECHNIQUE - **D.W. Briggs**, F.J. Fedel, C. Woolley, J. Foulke (164)
- 2:15 VARIATION OF MECHANICAL PARAMETERS DURING BICYCLE PEDALLING - **B.D. McLean**, M.A. Lafortune (333)
- 2:30 CHANGES IN PEDALLING TECHNIQUE OF ELITE CYCLISTS WITH INCREASED WORKLOAD - **S.A. Kautz**, M.E. Feltner, E.F. Coyle, A.M. Baylot (80)
- 2:45 MAXIMAL MUSCLE POWER OUTPUT IN BICYCLING AS A FUNCTION OF RIDER POSITION, RATE OF PEDALLING AND DEFINITION OF MUSCLE LENGTH - Y. Yoshihuku, **W. Herzog** (3)

Session #2

Ackerman 2nd Floor Lounge

Joint Kinematics & Kinetics

Chairs: Kathy Simpson (USA) - R. Rozendal (Holland)

- 1:30 FIVE MONTH IN VIVO MEASUREMENT OF HIP JOINT FORCES - **G. Bergmann**, F. Graichen, A. Rohlmann (43)
- 1:45 LOAD DIRECTIONS AT HIP PROSTHESES MEASURED IN VIVO - **G. Bergmann**, F. Graichen, A. Rohlmann (44)
- 2:00 RELATIVE ROLE OF ANKLE AND METATARSAL-PHALANGEAL MUSCLES IN BALLET POINTE WORK - **P.A. Dozzi**, D.A. Winter, M.G. Ishac (401)
- 2:15 MODELS INCORPORATING HEIGHT, DISTANCE AND LANDING TECHNIQUE TO PREDICT IMPACT FORCES - **J.S. Dufek**, B.T. Bates (15)
- 2:30 THE INFLUENCE OF IMPACT SPEED ON JOINT KINEMATICS AND IMPULSE CHARACTERISTICS OF DROP LANDINGS - **J.L. McNitt-Gray** (159)
- 2:45 GROUND REACTION FORCES AND DOMINANT LEG KINEMATICS DURING A RAPID STOP AND JUMP - **R. Shapiro**, J. Threlkeld, J.M. Ray (149)

Session #3

Haines Hall - Room 39

Muscle Function

Chairs: Felix Zajac (USA) - Peter Huijing (Holland)

- 1:30 A NOVEL APPROACH FOR MODELING TRANSIENT LENGTHENING WITH A HILL-BASED MUSCLE MODEL - **J.M. Winters** (128)
- 1:45 THE CONTRIBUTION OF INDIVIDUAL MUSCLES TO THE ANKLE MOMENT PRODUCED IN THE CAT HINDLIMB - **E.G. Fowler**, R.J. Gregor, J.P. Broker, R.R. Roy, J.A. Hodgson (450)
- 2:00 PROPERTIES OF TENDINOUS STRUCTURES OF RAT EDL MUSCLE-TENDON COMPLEX - **G.J.C. Ettema**, P.A. Huijing (178)
- 2:15 SOME STRUCTURAL PARAMETERS OF M. GASTROCNEMIUS LINKED IN A MODEL - **E. Wagemans**, M. Van Leemputte, E. Willems (316)
- 2:30 INFLUENCE OF MUSCLE GEOMETRY ON FORCE-VELOCITY CHARACTERISTICS OF GASTROCNEMIUS MEDIALIS (GM) OF THE RAT - **K.J. Zuurbier**, G.J.C. Ettema, P.A. Huijing (179)
- 2:45 APONEUROSIS CHARACTERISTICS OF RAT GASTROCNEMIUS MUSCLE - **H.J.W. Heslinga**, P.A. Huijing (180)

Session #4

Morgan Center Press Room

Electromyography

Chairs: Yoshiki Ogawa (Japan) - Roger Enoka (USA)

- 1:30 APPLICATION OF NONLINEAR FILTERING TO THE DECOMPOSITION OF SURFACE EMG SIGNALS - **H. Nieminen**, S. Hameenoja (349)
- 1:45 MULTI-ELECTRODE DATA ACQUISITION AND PROCESSING OF ELECTROMYOGRAPHIC (EMG) RECORDINGS - **M.S. Redfern**, D.B. Chaffin, D.J. Anderson (201)
- 2:00 COMPARISON BETWEEN SURFACE AND INTRA-MUSCULAR WIRE ELECTRODES - **B. Giroux**, M. Lamontagne (238)
- 2:15 TECHNIQUE FOR INTERPRETATION OF EMG FOR CONCENTRIC AND ECCENTRIC CONTRACTIONS IN GAIT - **S.H. Scott**, D.A. Winter (402)
- 2:30 A MODEL RELATING SURFACE EMG AND HIP ABDUCTOR TORQUE DURING WALKING - **R.F.M. Kleissen**, H.J. Hermens (13)
- 2:45 A MODEL RELATING EMG SIGNALS TO ELBOW TORQUE DURING RAPID LOADED MOVEMENT - **J.C. Woldstad**, D.B. Chaffin, G.D. Langolf (131)

Session #1**Moore Hall - Room 100****Data Processing and Methods**

Chairs: John Garhammer (USA) - Graeme Wood (Australia)

- 4:30 CSSP CONTINUOUS SIMULATION SOFTWARE
AN APPLICATION IN LOWER EXTREMITY
IMPACT LOADS SIMULATION - **A. Komor**,
I. Siwicki (399)
- 4:45 3-D PHOTOGRAMMETRIC CAMERA
CALIBRATION WITHOUT A CALIBRATION
OBJECT - **H.J. Woltring**, I.S. McClay, P.R.
Cavanagh (197)
- 5:00 3D MEASUREMENT OF REARFOOT MOTION
DURING RUNNING - **M. Areblad**, J. Ekstrand,
H. Ekstrom, K-O. Olsson (205)
- 5:15 A THREE-DIMENSIONAL MODEL FOR LEG
AND FOOT KINEMATICAL STUDIES -
M. Bulgheroni, C. Frigo (357)

Session #2**Ackerman 2nd Floor Lounge****Tissue**

Chairs: Ray Vanderby (USA) - Edgar Stussi (Switzerland)

- 4:30 EXPERIMENTAL MEASUREMENTS OF
PROXIMAL TIBIAL DISPLACEMENTS UNDER
LOAD: COMPARISON WITH FE MODELS -
A. Dujovne, H.W. Wevers (265)
- 4:45 PREDICTING TRABECULAR BONE
STRENGTH AND MICRO-STRAIN USING
HOMOGENIZATION THEORY - **D.P. Fyhrie**,
K.J. Jepsen, S.J. Hollister, S.A. Goldstein (173)
- 5:00 ESTIMATING THE DISTRIBUTION OF
SUBCHONDRAL BONE DENSITY BY MEANS
OF RECONSTRUCTED SECONDARY
SECTIONS - **M. Muller-Gerbl**, N. Hodapp,
E. Schulte, R. Putz (48)
- 5:15 HARMONIC WAVES IN A PRESTRESSED
ARTERY - **H. Demiray**, S. Dost (36)

Session #3**Haines Hall - Room 39****Movement Control**

Chairs: D. Kansal (India) - Victoria Panzer (USA)

- 4:30 CHOICES FOR OPTIMIZATION CRITERIA
FOR GOAL-DIRECTED SINGLE-JOINT
MOVEMENTS - **A.H. Seif-Naraghi**,
J.M. Winters (129)
- 4:45 SEGMENT TIMING AND INTERACTION IN
ARM MOVEMENT FOR MAXIMUM
VELOCITY UNDER DIFFERING LOAD
CONDITIONS - **B.D. Wilson**, I.A. Howick,
C.A. Putnam (351)
- 5:00 CONTROL OF RAPID MOVEMENT ONSET
UNDER CONDITIONS OF VARYING
RESISTANCE - **L. Abraham**, W.Kroll,
J. Ives (345)
- 5:15 MODULATION OF THE GASTROCNEMIUS
AND SOLEUS H-REFLEXES DURING
HOPPING - **T. Moritani**, L. Oddsson,
A. Thorstensson (271)

Session #4**Morgan Center Press Room****Simulation and Modeling**

Chairs: Herbert Hatze (Austria) - Hideo Oka (Japan)

- 4:30 USING KARUSH-KUHN-TUCKER
MULTIPLIERS TO EVALUATE THE EFFECT
OF ANTAGONIST MUSCLE ACTIVITY -
R.E. Hughes, D.B. Chaffin (133)
- 4:45 VALIDATION OF A MUSCULOSKELETAL
MODEL TO PREDICT FORCE IN HUMAN
QUADRICEPS MUSCLES - M. Lamontagne,
J.J. Dowling, E.D. Lemaire (235)
- 5:00 PHYSIOLOGICAL CONSIDERATION OF
MUSCLE FORCE DISTRIBUTION - **K.R.**
Kaufman, K. An, E.Y.S. Chao, W.J. Litchy (34)
- 5:15 INTERPRETATION OF MUSCLE ACTIVITY
DURING CYCLING BASED ON A
DYNAMICAL TWO-LEGGED
BIOMECHANICAL MODEL - **B.J. Fregly**,
F.E. Zajac (168)

Session #1 **Moore Hall - Room 100****Sport**

Chairs: Tadeusz Bober (Poland) - Barbara Gowitzke (Canada)

- 8:00 SPECTRAL ANALYSIS OF IMPACT SHOCK DURING RUNNING - **D.S. Winslow**, M.R. Shorten (56)
- 8:15 A COMPARISON OF SELECTED HEADFORMS UNDER IMPACT CONDITIONS - **P.J. Bishop** (259)
- 8:30 BALL IMPACT MECHANICS: BIOMECHANICAL IMPLICATIONS - **M. Hubbard**, J.R. Covarrubias, W. Bagenau, C. Jensen (279)
- 8:45 THE EFFECT OF CLUBFACE SHAPE ON SPIN OF A GOLF BALL - **R.J. Neal**, L.M. Hubinger (303)
- 9:00 MOMENT ABOUT THE VERTICAL AXIS DURING BASEBALL BATTING - **Y. Hirano** (331)

Session #2 **Ackerman 2nd Floor Lounge****Rehabilitation**

Chairs: Moshe Solomonow (USA) - Sandra Olney (Canada)

- 8:00 THE GAIT OF SUBJECTS WITH ANTERIOR CRUCIATE LIGAMENT DEFICIENCY - **P.J. McNair**, R.N. Marshall, J.A. Matheson (184)
- 8:15 PEAK POWER OUTPUT IN WHEELCHAIR SPRINTING - **H.E.J. Veeger**, L.H.W. van der Woude, D. Drexhage, J. Koperdraat (217)
- 8:30 CARDIOVASCULAR RESPONSES OF SEVERELY MENTALLY AND PHYSICALLY DISABLED PERSONS DURING LOWER BODY NEGATIVE PRESSURE - K. Mita, **K. Akataki**, T. Miyagawa, N. Suzuki, J. Yamakawa (284)
- 8:45 BIOMECHANICAL MEASUREMENT OF THE SWALLOWING REFLEX - **A.M. Joshi**, N.P. Reddy, M. Rane, E.P. Ouanilang (220)

Session #3 **Haines Hall - Room 39****Data Processing and Methods**

Chairs: Marten Bobbert (Canada) - Mont Hubbard (USA)

- 8:00 THE ASSESSMENT OF FIRST AND SECOND DERIVATIVES FROM NOISY KINEMATIC DATA - **G. Ferrigno**, M. D'Amico (75)
- 8:15 DETERMINATION OF THE OPTIMUM CUTOFF FREQUENCY IN THE DIGITAL FILTER DATA SMOOTHING PROCEDURE - **B. Yu** (113)
- 8:30 WALKING SYMMETRY AT DIFFERENT STEP FREQUENCIES: AN ANALYSIS BASED ON THE GROUND REACTION FORCE PROCESSING - **R. Rodano**, G.C. Santambrogio (299)
- 8:45 SEPARATION OF THE IMPACT AND ACTIVE COMPONENTS OF DROP JUMPS USING FOURIER ANALYSIS - **R.H. Sanders**, D. Wilson (242)
- 9:00 EVALUATION OF VERTICAL JUMPING TESTS - **J.T. Viitasalo**, T. Viljanen, U. Kujala (156)

Session #4 **Morgan Center Press Room****Gait**

Chairs: Phillip Martin (USA) - Anton van der Bogert (HOL)

- 8:00 PROPAGATION OF IMPULSIVE SHOCK WAVES IN THE HUMAN MUSCULOSKELETAL SYSTEM - **A.S. Voloshin** (37)
- 8:15 THE MEASUREMENT AND ROLE OF PROSTHETIC FOOT DAMPING - **J.L. Stein**, L. Olson, M. Mooradian, M. Weber (152)
- 8:30 CONTRIBUTION OF ANGULAR MOTION AND GRAVITY TO TIBIAL ACCELERATION - **M.A. Lafortune**, E.M. Hennig (334)
- 8:45 DETERMINING MUSCLE FORCE AND ENERGY IN THE LEG DURING HUMAN WALKING USING THE INVERSE DYNAMICS METHOD - **J.G.M. Thunnissen**, H.J. Grootenboer, H.F.J.M. Koopman, H.J. de Jongh (323)
- 9:00 DESIGN PRINCIPLES FOR A ZERO-GRAVITY LOCOMOTION SIMULATOR - **P.R. Cavanagh**, J. Polliner, B.L. Davis (434)

Ackerman Grand Ballroom

DATA PROCESSING AND METHODS

A SYSTEM FOR THE ANALYSIS OF THE BIOMECHANICS OF THE KNEE IN *IN VITRO* TESTS - **H. Schmotzer**, I.D. Learmonth, C.L. Vaughan (51)

IN SEARCH OF THE HOMUNCULUS - **C.L. Vaughan**, B.L. Davis, J.C. O'Connor (101)

A DIRECT MEASUREMENT OF THE DEFORMATION OF A RUNNING SHOE MIDSOLE AND OF THE HEEL PAD AT HEEL STRIKE DURING A RUNNING STEP - **D. DeClercq**, P. Aerts, E. Boumans, R. Claeys, M. Kunnen (211)

A NEW COMPUTER-ASSISTED MODEL TO ASSESS THE RANDOMNESS OF THE MUSCLE FIBER ARRANGEMENT IN SINGLE MOTOR UNITS - **P. Wallner**, T. Ansved, L. Larsson (228)

DATA ACQUISITION AND ANALYSIS SYSTEM ON MICRO COMPUTER FOR BIOMECHANICAL STUDIES - **M. Lamontagne**, D.C. Bradley, E.D. Lemaire (239)

THE REMOVAL OF ELECTRICAL STIMULATION ARTIFACT FROM SURFACE EMG - **J.J. Dowling**, K. McGuire (287)

METHOD TO DETERMINE 3D COORDINATES WITH PANNING CAMERAS - **G. de Groot**, J. de Koning, G.J. van Ingen Schenau (297)

BIOMECHANICAL DEVICES ON THE BASES OF FERROPIEZOEACTIVE ELEMENTS OF CERAMIC - **V.E. Yurkevich**, S.V. Malysheva, V.M. Mergold (310)

A RESEARCH INTO THE DEPENDANCE OF THE HYDRODYNAMIC CHARACTERISTICS OF BILEAFLET PROSTHETIC HEART VALVES IN RELATION TO THEIR AORTIC POSITION ORIENTATIONS - **V.M. Zaiko**, P.A. Volientzev (324)

APPLICATION OF COMPUTERIZED TOMOGRAPHY FOR OBTAINING INERTIA QUANTITIES OF THE HUMAN TRUNK - **W.S. Erdmann** (358)

ON A NEW MULTIFUNCTIONAL ISOKINETIC ERGOMETER - **A. Dal Monte**, S. Lupo, M. Faina (362)

TREADMILL ERGOMETER FOR POWER MEASUREMENT DURING SPRINT RUNNING - **A. Belli**, J-R. Lacour (391)

A SYSTEM FOR MEASUREMENT OF MECHANICAL POWER IN STRETCH-SHORTENING TYPE EXERCISES - **B. Morlon**, M. Jannin, C. Milan (408)

FLEXION TORQUE IN ANKLE JOINT MEASURING SET - **M. Wychowanski**, Z. Staniak, W. Musial (416)

SIMULATION OF 3D MOVEMENT REGISTRATION BASED ON THE DIRECT LINEAR TRANSFORMATION METHOD - T. de Haan, **B.P.L.M. den Brinker** (439)

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ERGONOMICS

SCALING OF FOOT DIMENSION - **J.R. Robinson**, E.C. Frederick (127)

EFFECTS OF VARIOUS LOADS AND SPEEDS ON THE KINEMATICS OF CLIMBING - **L. Dee**, M. Adrian (158)

THE EFFECTS OF SEAT POSITION AND LOWER EXTREMITY KINEMATICS ON AUTOMOBILE BRAKE PEDAL FORCE CAPABILITY - **K. Kulig**, R. Cathers, C. Erickson (174)

LEG DOMINANCE AND BIOMECHANICAL SLIP MECHANISMS - **R.O. Andres**, T. Eng, D. O'Connor (176)

EFFECT OF KNOWLEDGE OF THE LOAD ON LIFTING TECHNIQUE - D. Butler, **J. Trafimow**, O.D. Schipplein, G. B. J. Andersson, T.P. Andriacchi (215)

PREDICTION OF THE PINCH AND GRASP FORCE EXERTED BY THE HAND USING SURFACE AND FINE WIRE ELECTROMYOGRAPHY - **Y. Li**, R. Wells, D. Ranney, A. Moore (223)

A SYSTEM TO PREDICT INTERNAL FACTORS RELATED TO THE DEVELOPMENT OF CUMULATIVE TRAUMA DISORDERS OF THE CARPAL TUNNEL AND EXTRINSIC FLEXOR MUSCULATURE - **A.E. Moore**, R.P. Wells, D. Ranney (257)

CHARACTERISTICS OF PRESSURE DISTRIBUTION WHILE SITTING ON VARIOUS KINDS OF SEATS - **K. Nicol** (275)

A BIOMECHANICAL AND PHYSIOLOGICAL COMPARISON OF STANDARD AND REVERSE BICYCLE PEDALLING - **A. Ayalon**, M. Tavi, R. Dotan, D. Ben-Sira (393)

MOVEMENT CONTROL

MUSCLE ACTIVATION CHANGES ASSOCIATED WITH LOADS AT ADJACENT JOINTS *or* WHY MUSCLE MOMENT ARMS ARE NOT SUFFICIENT TO PREDICT FUNCTIONAL ROLE - **T.S. Buchanan**, G.P. Rovai, W. Z. Rymer (72)

EFFECTS OF FATIGUE INDUCED BY STRETCH-SHORTENING EXERCISE ON VERTICAL JUMP, MAXIMAL ISOMETRIC FORCE, AND PATELLAR REFLEX - **T. Hortobagyi**, W. Kroll, N.J. Lambert (79)

CALCULATING IDEAL BAT WEIGHT USING THE MUSCLE FORCE-VELOCITY RELATIONSHIP - **Y. Laouris**, W.J. Karnavas, A.T. Bahill (106)

SENSITIVITY OF SIMULATED HUMAN GAIT TO NEUROMUSCULAR CONTROL PATTERNS - **G.T. Yamaguchi**, F.E. Zajac (166)

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MOVEMENT CONTROL (continued)

VISUAL CONTROL OF LOCOMOTION: STRATEGIES FOR CLEARING OBSTACLES - **A.E. Patla**, S. Prentice, C. Robinson (261)

TWO-DIMENSIONAL ASSESSMENT OF HAND MOVEMENTS **K. Jaworek**, A. Rutkowska-Kucharska, T. Bober (276)

INFLUENCE OF THE DURATION OF INTERSTIMULUS INTERVAL ON MOTOR PREPARATION RECORDED AT THE CORTICAL AND SPINAL LEVEL - **Y. Taniguchi**, M. Miyashita (314)

EFFECTS OF PRACTICE ON MYOELECTRIC AND KINEMATIC CORRELATES OF HUMAN MOVEMENT - **S. Jaric**, D.M. Corocs, G.L. Gottlieb, G.C. Agarwal (363)

SWING-PHASE DYNAMICS AND EMG DURING BACKWARD QUADRUPED WALKING - **J.A. Buford**, R.F. Zernicke, J.L. Smith (372)

EFFECT OF AGE ON THE TIME COURSE OF POSTURAL ADJUSTMENT ACCOMPANYING STEPPING - **A.E. Patla**, J.S. Frank (388)

DEVELOPMENT OF ISOMETRIC FORCE ACTION PROGRAMMED FOR WEIGHT DURING A LIFTING TASK WITH PRECISION GRIP - **H. Kinoshita**, H. Forssberg (419)

THE PATHOGENY OF ANKLE SPRAIN: EVALUATION OF A HYPOTHESIS - J.L. Thonnard, **P. Willems**, L. Plaghki, J. DeNayer (447)

MUSCLE FUNCTION

THE DYNAMIC MODEL OF SKELETAL MUSCLE:
I. RESPONSE OF NINE DIFFERENT MUSCLES - **R. Baratta**, M. Solomonow, S. Hwang, M. Itchie (4)

THE DYNAMIC MODEL OF SKELETAL MUSCLE:
II. DYNAMICS OF THE TENDON AND JOINT - **R. Baratta**, M. Solomonow (5)

PROPRIOCEPTIVE CONTROL OF MUSCLE CONTRACTION UNDER CHANGING LOAD - MODEL INVESTIGATIONS - **S.P. Romanov** (10)

COCONTRACTION OF THE ELBOW MUSCLES WHILE PERFORMING COMBINED TASKS OF PRONATION-FLEXION AND SUPINATION-FLEXION - **L.J. Bebert**, S. DeSerres, C. Goulet, A.B. Arsenault (66)

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MUSCLE FUNCTION (continued)

CARDIAC-LOCOMOTOR COUPLING DURING SUSTAINED NATURAL HOPPING - **R.L. Kirby**, S.M. Atkinson, D.A. Macleod (67)

COMPARISON OF PEAK AND CONSTANT ANGLE TORQUE-VELOCITY CURVES DURING ECCENTRIC AND CONCENTRIC ARM FLEXION IN HIGH STRENGTH AND LOW STRENGTH INDIVIDUALS - **T. Hortobagyi**, F.I. Katch (78)

WAVE ANALYSIS ON SURFACE OSCILLATION SIGNALS FROM TWITCH CONTRACTION - **M. Tokudome**, A. Nagata, M. Miyazawa (84)

THE REFRACTORY PERIOD OF NEUROMUSCULAR SYSTEM BY EVOKED ACTION POTENTIAL DURING MUSCLE FATIGUE - **M. Muro**, M. Yona, K. Shimoshikiryou, A. Nagata (142)

BIOMECHANICAL ASSESSMENT OF EXERCISE INDUCED MUSCLE DAMAGE - **K.G. Holt**, R. O. Andres, P.M. Clarkson (175)

3D MUSCLE ACTIVATION SURFACES - ANGULAR RELATIONSHIPS - **R.N. Marshall**, S.M. Mazur, N.A.S. Taylor (183)

MUSCLE TORQUE AND VELOCITY RELATIONSHIP IN ELITE POWER AND ENDURANCE ATHLETES - N.A.S. Taylor, J.D. Cotter, S.N. Stanley, **R.N. Marshall** (185)

DIFFERENCES IN EMG-ACTIVITY BETWEEN PATIENTS WITH SHOULDER INSTABILITY AND NORMAL CONTROLS - **G. Nemeth**, M. Kronberg, L-A. Brostrom (189)

THE DEVELOPMENT OF THE ISOKINETIC MUSCLE TORQUE IN THE DORSIFLEXORS OF THE ANKLE IN CHILDREN 6-15 YEARS OF AGE - E. Backman, **B. Oberg** (204)

THE EFFECTS OF AGE ON CONTRACTILE, MORPHOMETRICAL AND ENZYME-HISTOCHEMICAL PROPERTIES OF THE RAT SOLEUS MUSCLE - **T. Ansved**, L. Larsson (229)

CONTRIBUTION OF COUNTER MOVEMENT TO JUMPING PERFORMANCE: A COMPARISON OF GYMNASTS VERSUS SWIMMERS - **A. Ito**, M. Kaneko, M. Saito (266)

SOME FACTORS AFFECTING ECCENTRIC CONTRACTION STRENGTH - **Y. Kawakami**, T. Fukunaga, H. Kanehisa, M. Miyashita (330)

REGULATION OF MUSCLE FORCE AND STIFFNESS DURING LONG JUMP TAKE OFF - **H. Kyrolainen**, J. Avela, P.V. Komi (364)

LENGTH CHANGE OF THE HUMAN KNEE EXTENSORS COMPLEX DURING PRELIMINARY COUNTER MOVEMENT IN VERTICAL JUMP - **T. Kojima** (386)

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MUSCLE FUNCTION (continued)

ACHILLES TENDON FORCE DURING ANKLE HOPPING -
S. Fukashiro, P.V. Komi, M. Jarvinen (412)

ON THE ENERGY TRANSFER BY MUSCLE DURING WAVE
MOTION OF HUMAN BODY'S SEGMENTS - **G.I. Popov** (427)

MUSCLE STRENGTH DEVELOPMENT IN BOYS AGED
7-14 - **L. B. Dworak** (440)

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Session #1

Moore Hall - Room 100

Sport

Chairs: Bruce Elliot (Australia) - Jukka Viitasalo (Finland)

- 4:00 The development of a computer system for studying consecutive vertical jumps - **L. Fernandes**, M.D. D'Angelo (115)
- 4:15 Step length, frequency, velocity and power relationships in running and jumping - **P. Luhtanen**, A. Mero, C. Bosco (82)
- 4:30 Techniques used by elite long jumpers in preparation for takeoff - **J.G. Hay**, H. Nohara (112)
- 4:45 An analysis of angular momentum during the run-up and takeoff in long jumping - **R.N. Hinrichs**, B.A. Munkasy, S.A. Chinworth (230)
- 5:00 Short term effects of voluminous heavy resistance training and recovery on the snatch technique in weight-lifting - **H. Kauhanen**, K. Hakkinen (31)
- 5:15 Neuromuscular adaptations and hormone balance in strength athletes, physically active males and females during intensive strength training - **K. Hakkinen**, A. Pakarinen, P.V. Komi, T. Ryushi, H. Kauhanen (8)
- 5:30 Some aspects of the ANSYN-approach to motion analysis - **H. Hatze** (437)
- 5:45 Three dimensional analysis of the snatch technique for two world record creators at the 6th national athletic meeting of PRC, 1987 - **Zhang Yue** (326)

Session #2

Ackerman 2nd Floor Lounge

Spine

Chairs: James Ashton-Miller (USA) - Krzysztof Kedzior (Poland)

- 4:00 LUMBAR SPINE AND PSOAS MUSCLE GEOMETRY REVISITED WITH MAGNETIC RESONANCE IMAGING - **A. Thorstensson**, E. Andersson, A.G. Cresswell (251)
- 4:15 INTRA-ABDOMINAL PRESSURE AND PATTERNS OF ABDOMINAL MUSCLE ACTIVATION IN ISOMETRIC TRUNK FLEXION AND EXTENSION - **A.G. Cresswell**, A. Thorstensson (252)
- 4:30 TORSIONAL STRENGTH AND MUSCLE ACTIVITY DURING AXIAL TWISTING OF THE TRUNK - **S.M. McGill**, S.L. Kane (255)
- 4:45 CONTRIBUTION TO THE STABILITY ANALYSIS OF INTACT AND INJURED LUMBOSACRAL SPINE - **L.P. Nolte**, M.M. Panjabi (212)
- 5:00 L4-L5 SHEAR FORCE REDUCTION BY LOW BACK MUSCULATURE DURING LIFTING - **J.R. Potvin**, R.W. Norman, S.M. McGill, M.F. Eckenrath (258)
- 5:15 THE LUMBARATOR - A REAL TIME SIMULATOR OF LUMBAR MUSCLES FORCE DISTRIBUTION - **Z. Ladin**, S. Guha (155)

Séssion #3

Haines Hall - Room 39

Movement Control

Chairs: Toshio Moritani (Japan) - Keith Hayes (Canada)

- 4:00 C OF P VS. C OF G CHANGES DURING QUIET STANDING AND VOLUNTARY SWAY IN THE FRONTAL AND SAGITTAL PLANES - **G.K. Ruder**, C. Mackinnon, D.A. Winter (241)
- 4:15 SOME OBSERVATIONS ON THE USE OF CENTRE OF PRESSURE FOR ASSESSMENT OF BALANCE - **J.S. Frank**, A.E. Patla, D.A. Winter (389)
- 4:30 DYNAMIC TRANSFER OF BODY MASS FROM BIPEDAL TO SINGLE LIMB STANCE - **M.W. Rogers**, Yi-Chung Pai (172)
- 4:45 BIOMECHANICAL CHANGES IN POSTURAL CONTROL CONCURRENT WITH AGING - **V.P. Panzer**, S. Bandinelli, M. Hallett (73)
- 5:00 REACTION TIME AND POSTURAL RESPONSES DURING ARM MOVEMENTS IN THE FRONTAL AND SAGITTAL PLANES - **L. Oddsson** (253)
- 5:15 ANTICIPATORY POSTURAL SUPPORT RESPONSES: EFFECT OF DIRECTION AND TYPE OF INTENDED MOVEMENT - **A.E. Patla** (260)
- 5:30 DEVELOPMENT OF FRICTION ANTICIPATION AND ADAPTATION IN THE HUMAN PRECISION GRIP - **H. Kinoshita**, H. Forssberg (418)

Session #4

Morgan Center Press Room

Simulation and Modeling

Chairs: Maury Hull (USA) - M.R. Yeadon (Canada)

- 4:00 ACOUSTIC EMISSION DURING COMPRESSION FROM NORMAL AND DISEASED BONE - A. Bivas, I. Leichter, I. Roman, A. Simkin (20)
- 4:15 A GENERALIZED THREE-DIMENSIONAL SIX SEGMENT MODEL OF THE ANKLE AND THE FOOT - **M.M. Morlock** (192)
- 4:30 A MECHANICAL MODEL TO SIMULATE AND PREDICT HUMAN WALKING - **H.F.J.M. Koopman**, H.J. Grootenboer, H.J. de Jongh (342)
- 4:45 MODELING AND SIMULATION OF HUMAN GAIT IN THREE DIMENSIONS WITH MULTIBOND GRAPHS - **P.C. Matthijsse**, P.C. Breedveld (208)
- 5:00 SIMULATION OF 3D MOVEMENT REGISTRATION BASED ON THE DIRECT LINEAR TRANSFORMATION METHOD - T. de Haan, **B.P.L.M. den Brinker** (385)
- 5:15 USING A SIMULATION TECHNIQUE TO QUANTIFY COMPONENTS OF HIP AND KNEE TORQUES DURING CONSTANT-VELOCITY CYCLING - **B.L. Davis** (438)
- 5:30 VALIDATION OF A THREE-DIMENSIONAL KINEMATIC MODEL OF THE LOWER EXTREMITY OF A CYCLIST - **P.R. Francis**, J. Rodriguez, H. Shen, R. Radharamanan (421)

Session #1 **Moore Hall - Room 100****Sport**

Chairs: Lilliam Fernandes de Oliveira (Brazil) -
Bruce Mason (Australia)

- 8:00 SOME MYOELECTRIC AND KINETIC CORRELATES OF GYMNASTIC SKILL - **V. Medved**, S. Tonkovic (384)
- 8:15 A BIOMECHANICAL ANALYSIS OF HAND SPRING VAULT IN INDIAN FEMALE GYMNASTS - **R. Rai**, G.S. Bawa, T. Singh, N. Gulati, A. Goel (435)
- 8:30 A COMPARISON OF TECHNIQUES USED BY ELITE MALE AND FEMALE GYMNASTS PERFORMING A HANDSPRING VAULT - **Y. Takei** (232)
- 8:45 TECHNIQUE COMPARISONS BETWEEN HARD AND SOFT LANDINGS OF YOUNG FEMALE GYMNASTS - **C.L. Tant**, J.D. Wilkerson, K.D. Browder (118)
- 9:00 FORCE DISTRIBUTION IN VARIOUS RUGBY UNION SCRUMMING TECHNIQUES - **P.D. Milburn** (293)
- 9:15 A RESEARCH FOR THE INNOVATORY MOVEMENT OF STRAIGHT TKATCHEV IN HORIZONTAL BAR - **Q. Jिंगgang**, C. Guojun, T. Shangzhi, Z. Lixing (17)
- 9:30 THE BIOMECHANICS OF TAIJIQUAN PUSHING HANDS - **Z. Liu**, H. Men, G. Gan (28)

Session #2 **Ackerman 2nd Floor Lounge****Data Processing and Methods**

Chairs: Jean Landa Pytel (USA) -
Bart van Gheluwe (Belgium)

- 8:00 A TREADMILL MOUNTED FORCE PLATFORM - **R. Kram** (295)
- 8:15 A NEW TRANSDUCER TECHNOLOGY FOR MEASUREMENT OF PLANTAR PRESSURES - **K.T. Stone**, C.L. Vaughan (100)
- 8:30 A METHOD OF MEASURING TRANSLATIONAL AND ROTATIONAL TRACTION CHARACTERISTICS OF FOOTWEAR - **G.A. Valiant** (122)
- 8:45 CORRECTION OF POINT OF APPLICATION READINGS OF PIEZO-ELECTRIC FORCE PLATES - **M.F. Bobbert**, H.C. Schamhardt (196)
- 9:00 AN ANTHROKINETOMETRIC STUDY OF MALE MONTREAL OLYMPIC ATHLETES - **D. Kansal** (346)
- 9:15 A METHOD FOR MEASURING SMALL JOINT SURFACES, AND PRELIMINARY RESULTS FOR THE METACARPOPHALANGEAL JOINTS - **D.C. Marsden**, A.C. Nicol (282)
- 9:30 NUMERICAL DIFFERENTIATION OF NOISY DATA - **M.R. Yeadon** (125)

Session #3 **Haines Hall - Room 39****Muscle Function: One- & Two-Joint Muscles**

Chairs: Gerrit van Ingen Schenau (Holland) -
Gunnar Nemeth (Sweden)

- 8:00 REGRESSION EQUATIONS FOR ESTIMATING THE LENGTH OF SIX BIARTICULAR MUSCLE-TENDON COMPLEXES OF THE LOWER EXTREMITY AS A FUNCTION OF HIP AND KNEE FLEXION ANGLES - **D. Hawkins**, M.L. Hull (89)
- 8:15 WHAT IS THE ROLE OF BIARTICULAR MUSCLES DURING JUMPING? - **M.G. Pandy**, F.E. Zajac, A. Kuo (165)
- 8:30 CHANGES IN LENGTH OF HUMAN RECTUS FEMORIS MUSCLE FIBERS AS A FUNCTION OF CHANGES IN KNEE JOINT ANGLE - **W. Herzog**, S.K. Abrahamse (191)
- 8:45 MAXIMAL VOLUNTARY CONTRACTIONS OF THE LEG DURING UNILATERAL AND BILATERAL WORK - **A. Kibele**, K. Muller (294)
- 9:00 MUSCLE'S ACTION TO PRODUCE ANGULAR ACCELERATION WITH APPLICATION TO STANDING - **F.E. Zajac**, M.E. Gordon (170)
- 9:15 EFFECTS OF RATE OF FORCE DEVELOPMENT ON LIGAMENT-MUSCLE SYNERGIES IN NORMAL KNEES - **M.D. Grabiner**, G.F. Miller, K.R. Campbell, D. Metzger (163)

Session #4 **Morgan Center Press Room****Gait**

Chairs: Thomas Andriacchi (USA) -
Masahiro Kaneko (Japan)

- 8:00 THREE-DIMENSIONAL ASSESSMENT OF HUMAN GAIT - **K. Jaworek**, G. Ferrigno, G.C. Santambrogio (249)
- 8:15 A METHOD FOR COMPUTING THE THREE-DIMENSIONAL FORCES AND MOMENTS IN THE LOWER LIMB DURING GAIT - **M.C. Verstraete**, R.W. Soutas-Little (76)
- 8:30 LOWER EXTREMITY MOMENTS OF FORCE DURING THREE GAIT CONDITIONS - **P.K. Schot**, J.S. Dufek, B.T. Bates (94)
- 8:45 ANALYSIS OF GROUND REACTION TORQUE IN WALKING AND RUNNING - **R.W. Soutas-Little** (95)
- 9:00 INTRASUBJECT VARIABILITY IN LOWER EXTREMITY JOINT MOMENTS OF FORCE DURING THE SUPPORT PHASE OF RUNNING - **P. DeVita**, W.A. Skelly (60)
- 9:15 THE EFFECT OF LOWER EXTREMITY INERTIA MANIPULATION ON WALKING ECONOMY AND MECHANICS - **P.E. Martin**, D.W. Morgan, G.D. Heise (97)

Session #1

Moore Hall - Room 100

Sport: Running

Chairs: W. Lutz Bauer (FRG) - Vladimir Zatziorsky (USSR)

- 8:00 A BIOMECHANICAL ANALYSIS OF CHANGES IN RUNNING TECHNIQUE DURING A TREADMILL RUN TO VOLITIONAL EXHAUSTION - **W.L. Siler**, P.E. Martin (161)
- 8:15 COMPARISON OF MAXIMAL SPRINT RUNNING AND SPRINT SPECIFIC STRENGTH EXERCISES - **A. Mero**, P.V. Komi (41)
- 8:30 A COMPARISON OF DISTANCE RUNNING KINEMATICS BETWEEN TREADMILL AND COMPETITIVE RUNNING AND BETWEEN GENDERS - **K.R. Williams**, R.E. Snow, J.E. Jones (139)
- 8:45 PHASE DIAGRAM APPLIED IN EVALUATING TECHNIQUE FACTORS IN RUNNING - **T. Bober** S. Prassas (361)
- 9:00 THE EFFECT OF RUNNING SPEED ON LOWER EXTREMITY JOINT MOMENTS DURING THE SUPPORT PHASE - **K.J. Simpson**, B.T. Bates (321)

Session #2

Ackerman 2nd Floor Lounge

Rehabilitation/Prosthetics/Orthotics

Chairs: Barney LeVeau (USA) -
Mario Lamontagne (Canada)

- 8:00 COMPARISON OF THE BIOMECHANICAL BEHAVIOR OF DIFFERENT FOOT PROSTHESES DURING WALKING AND RUNNING - **U. Glitsch**, W. Baumann (278)
- 8:15 MUSCLE STIMULATION POWERED ORTHOSIS: A PRACTICAL WALKING SYSTEM FOR PARAPLEGICS - **M. Solomonow**, H. Shoji, R. Baratta, R. D'Ambrosia (7)
- 8:30 EFFECTS OF FOOT ORTHOTICS UPON THE ANKLE AND KNEE MECHANICAL ALIGNMENT - **R. Lefebvre**, J.P. Boucher (114)
- 8:45 ORTHOPEDIC SHOES FOR CHILDREN WITH CEREBRAL PALSY IN RESIDUAL STAGE AND "PES EQUINO-VARUS CONGENITAL" WHICH IS FEEBLY MARKED OR WAS SURGICALLY TREATED - **I.A. Mendelevich**, M.R. Pitkin (375)
- 9:00 REHABILITATION MECHANISMS OF CHILDREN WITH CEREBRAL PARALYSIS BY SIMULTANEOUS NERVOUS EFFECT OF ELECTRIC CURRENTS AND MAGNETIC FIELD ON CHILD NEUROMOTIVE SYSTEM - **Y.V. Seregin** (378)

Session #3

Haines Hall - Room 39

Orthopaedics

Chairs: Robert Whalen (USA) - Xinxiang Xu (P.R. China)

- 8:00 TELEMETRIC MEASUREMENT OF THE PRESSURE CONDITIONS IN THE INTERFACE ON AN IMPLANTED ACETABULUM PROSTHESIS (IN-VIVO) - H. Bereiter, **B. Zurfluh**, R. Maffioli, H.R. Hidber, E. Morscher (209)
- 8:15 THREE-DIMENSIONAL GEOMETRIC ANALYSIS OF HUMAN FEMURS FOR DESIGN OF TOTAL HIP ENDOPROSTHESES - **G. Herndl**, W. Siebels, T. Gerhard (354)
- 8:30 DETERMINATION OF HIP, KNEE, AND ANKLE RANGE OF MOTION DURING CYCLING USING AN ADJUSTABLE CRANK ASSEMBLY - **B.F. LeVeau**, L. Fleming, A. Wilson, D. Short (123)
- 8:45 FLEXIBILITY OF THE HUMAN KNEE UNDER PURE VARUS/VALGUS AND AXIAL MOMENTS IN VIVO - **O.S. Mills**, M.L. Hull (136)
- 9:00 TORSION AND REARFOOT STABILITY IN RUNNING - **X. Kalin**, A. Stacoff, E. Stussi (111)

Session #4

Morgan Center Press Room

Ergonomics

Chairs: Don Chaffin (USA) - Stuart McGill (Canada)

- 8:00 GRIP STRENGTH IN MALE MANUAL WORKERS: INFLUENCE OF VIBRATION EXPOSURE AND SELF REPORTED SYMPTOMS - **A. Lee**, M. Hagberg (26)
- 8:15 RESPONSE OF BIOMECHANICAL CORRELATES OF CUMULATIVE TRAUMA DISORDERS IN THE CARPAL TUNNEL AND EXTRINSIC FLEXOR MUSCULATURE TO SIMULATED WORKING CONDITIONS - **A.E. Moore**, R.P. Wells (256)
- 8:30 GRIP STRENGTH AND LEG DESIGN OF POWER GRIP HAND TOOLS - **C. Fransson**, J. Winkel (374)
- 8:45 BIOMECHANICAL ANALYSIS OF THE GLENO-HUMERAL JOINT IN ERGONOMICAL ASPECTS - **K. Gielo-Perczak**, A. Morecki (382)
- 9:00 COMPARISON OF BACK AND LEG MUSCULAR UTILIZATION DURING A LOAD CARRYING TASK - **M.C. Normand**, Y. Lajoie, L. Proteau (286)

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ELECTROMYOGRAPHY

EFFECTS OF DYNAMIC FEATURES OF TENNIS RACKETS ON MUSCULAR LOAD OF TENNIS PLAYERS -

M. Yoshizawa, M. Kumamoto, Y. Nemoto, T. Itani, B. Jonsson (64)

BIARTICULAR MUSCLE ACTIVITIES DURING FRONT HANDSPRING IN TUMBLING - **H. Oka**, T. Okamoto, M. Kumamoto (65)

TIME DELAY (EMD) BETWEEN THE EVOKED ELECTROMYOGRAM (EMG) AND THE EVOKED TORQUE - **Y. Ogawa**, A. Nagata, M. Muro (81)

AUTO-REGRESSION ANALYSIS UPON EMG POWER SPECTRA DURING DYNAMIC EXERCISE - **A. Nagata**, M. Miyazaki (134)

ELECTROMYOGRAPHIC RESPONSES IN UPPER EXTREMITIES INDUCED BY MAGNETIC BRAIN STIMULATION - **T. Miyagawa**, K.C. Hayes, D. Wolfe, O. Kameyama, K. Mita (147)

THE NORMALIZATION OF ELECTROMYOGRAPHIC SIGNAL - Y. Lajoie, L. Laurencelle, **M.C. Normand** (285)

GAIT

FORELIMB MOTION CYCLES OF THE EQUINE GALLOP STRIDE - **N.R. Deuel** (27)

GROUND REACTION FORCE SYMMETRY IN THE GAIT OF OSTEOARTHRITIC WOMEN - **K.M. Knutzen**, L.R. Brilla, K. Quinn, V. Wittman (105)

ENERGY AND POWER CONSIDERATIONS IN SLOW WALKING - **S.J. Olney**, R.C. Grondin, I.D. McBride (117)

PLANTAR PRESSURE DURING BAREFOOT WALKING - **M.R. Shorten**, K. Beekman Eden, J.A. Himmelsbach (121)

EFFECTS OF LOAD CARRIAGE OF THE LOWER LIMBS - **A. Eng Joo**, J.C.H. Goh (135)

THE EFFECT OF ORTHOTICS IN ALTERING REARFOOT MOTION - **M.A. Cairns**, G. Catalano, B. Beebe (154)

ANKLE ARTHRODESIS - KINEMATIC AND KINETIC EFFECTS IN LOCOMOTION - **R.N. Marshall**, G.A. Wood, S. Nade (181)

LIMB-JOINTS MECHANICAL ANALYSIS: THE USE OF FORCE PLATES AND C.C.D. CAMERAS - F. Pelisse, F. Marie, **D. Geiger** (263)

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GAIT (continued)

THE INFLUENCE OF TRACK HARDNESS ON GAIT KINEMATICS IN PACERS - **B.D. Wilson**, R.H. Sanders (352)

ARCH INDEX AND KINEMATIC LOWER EXTREMITY MEASURES - **J. Hamill**, B.T. Bates, K.M. Knutzen (396)

THE DEVELOPMENT OF GAIT FROM THE VIEWPOINT OF TEMPORAL AND DISTANCE FACTORS - **Y. Takanashi**, S. Kaneko, H. Yano, M. Miyashita (332)

JOINT KINEMATICS and KINETICS

MATHEMATICAL MODEL ANALYSIS OF PATELLAR DISLOCATION - **S. Hirokawa**, M. Solomonow, K. Matsumura (85)

PREDICTIVE CHANGES IN THE BIOMECHANICAL RELATIONSHIP OF THE HEAD AND NECK DUE TO OCCLUSAL SPLINT TREATMENT - **C.J. Zebas**, E.A. Zang, E. Elliott (102)

JOINT TORQUE PRODUCTION AND EMG ACTIVITY DURING SPRINT RUNNING OF SPRINTERS AND DISTANCE RUNNERS - **T. Fuchimoto**, A. Ito, M. Kaneko (267)

CHANGES IN JOINT MOMENTS FOR A STANDARDIZED JUMP BETWEEN FIVE AND TWENTY YEARS - **R.K. Jensen** (302)

SEGMENT-LINES MODELING OF HUMAN ELBOW JOINT DRIVE - **Y.E. Toshev**, R.T. Raikova (379)

JOINT MOMENTS CAUSED BY MUSCLE ACTION - ISOMETRIC CONTRACTIONS - F. Gatto, **R. Neal**, P. Swannell (387)

EFFECTIVENESS OF ARM MOVEMENT ON PERFORMANCE OF THE MAXIMUM VERTICAL JUMP - **Y. Yamazaki**, M. Suzuki, T. Mano (414)

THE HUMAN FOOT: A COMPOSITE SPRING WITH STRAIN DEPENDENT EXPONENTIALLY INCREASING STIFFNESS - **F. Bojsen-Moller**, K. Misevich, E. Bruun Simonsen, M. Voigt (424)

A TELESCOPING EFFECT OF THE HUMAN HAND AND FOREARM DURING HIGH ENERGY IMPACTS - **M. Voigt** (425)

DECISION OF DISTRIBUTIONAL PROBLEM USING "LOGICAL" AND "ILLOGICAL" OPTIMIZATION CRITERIA - **A. Aruin**, V. Zatsiorsky, B. Prilutsky (431)

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ORTHOPAEDICS

EARLY BONE STRUCTURE AND FUNCTIONAL RECONSTRUCTIONS AT THE END OF LONG BONES AFTER TUMOR REMOVAL - **Xinxiang Xu**, C.M. Hu, H.L. Zhao, C.S. Li (108)

THE DEVELOPMENT OF A SIZE AND SHAPE MATCHING INDEX FOR OSTEOCHONDRAL ALLOGRAFTS - E.Y.S. Chao, M.L. Samson, **K.N. An**, M.G. Rock, R. Robb (320)

KINETIC ANALYSIS OF CANINE GAIT BEFORE AND AFTER TOTAL HIP REPLACEMENT - S. Dogan, **R. Vanderby, Jr.**, P.A. Manley, D.M. Belloli, L. Hartman, A.A. McBeath (355)

EFFECTS OF CONTINUOUS PASSIVE MOTION ON GEOMETRICAL AND MECHANICAL PROPERTIES OF LONG BONE - **J. C-H. Hou**, R. Zernicke, M. Kody, R. Meals (371)

REHABILITATION

DYNAMICS FORWARD INSTABILITY OF A WHEELCHAIR WITH ONE FOOTREST ELEVATED - **R.L. Kirby**, E.A. MacKay (68)

THE EFFECTS OF SIMULATED KNEE FLEXION CONTRACTURES ON STANDING BALANCE - **P.J. Potter**, R.L. Kirby, D.A. MacLeod (69)

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A STUDY OF CERVICAL MUSCLE RESPONSE TO EXPERIMENTALLY-INDUCED MUSCLE PAIN - **J.A. Ashton-Miller**, K.M. McGlashen, J.E. Herzenberg (151)

A COMPUTERIZED METHOD FOR REGISTRATION OF SAGITTAL BACK SHAPE AND MOBILITY - **O.K. Svensson**, B. Walldius, A. Walldius (198)

THREE-DIMENSIONAL MOVEMENT OF THE WHOLE LUMBAR SPINE - **I. Yamamoto**, M. Panjabi, T. Crisco, T. Oxland (213)

A COMPUTER MODEL ANALYSIS DETERMINING THE LUMBAR COMPRESSIVE AND SHEAR FORCES DURING VARIOUS TRUNK CURL-UP EXERCISES - **C. Johnson**, J.G. Reid, S. Byberg (222)

MODEL OF HUMAN SPINE SYSTEM - M. Dietrich, **K. Kedzior**, T. Zagrajek (381)

ANALYSIS OF THE VIBRATIONS OF THE VERTEBRAL COLUMN IN THE MAN-VIBRATING OBJECT SYSTEM - **M. Nader**, O. Krettek (420)

Ackerman Grand Ballroom

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A STUDY OF STABILITY OF STANDING SHOOTING - **Lu Deming**, Chen Wei, Huang Zongcheng (11)

DYNAMICS AND BIOMECHANICS OF START AND ACCELERATED PHASE OF A SPRINT - **Hu Lin-Yi** (32)

KINEMATIC VARIABILITY OF THE TENNIS FOREHAND DRIVE - **D.V. Knudson**, E.M. Roberts (39)

GRIPPING FORCES AND HAND ACCELERATION WAVES DURING THE GOLF SWING - **K. Kawashima**, A. Nagata (57)

BIOMECHANICAL CHARACTERISTICS OF PROPULSIVE TORQUE GENERATION IN TWO GROUPS OF ELITE CYCLISTS - **M.E. Feltner**, S.A. Kautz, E.F. Coyle, A. Baylor (92)

KINETIC ANALYSIS OF THE SERVING ARM DURING THE PERFORMANCE OF THE TENNIS SERVE - **R.E. Bahamonde** (99)

KINEMATIC AND TEMPORAL CHARACTERISTICS APPLIED TO SUCCESS: GOALS IN FIELD HOCKEY - **L.A. Klatt** (116)

ON THE STATIONARY REGION OF FLUID RESISTANCE CURVE IN SWIMMING - **Yuan Jinchun**, Liang Zhaochang, Zhang Deming, Hou Zema (187)

A BIOMECHANICAL RATIONALE FOR THE PREFERRED STYLE OF RUNNING - **A.E. Chapman**, R.M. Lonergan (233)

MECHANICAL VERIFICATION OF THE EFFECTIVENESS OF THE FIRST STEP FOR QUICK CHANGE OF THE FORWARD RUNNING DIRECTION - **T. Ohtsuki**, M. Yanase (237)

FRICTIONAL FORCES AND TORQUES DURING A FOREHAND DRIVE AND A STANDARD LABORATORY TEST FOR DIFFERENT TENNIS SHOES AND PLAYING SURFACES - **B. van Gheluwe**, E. Deporte (280)

BIOMECHANICAL STUDY ON SPRINT FORM AND MUSCLE STRAIN - **A. Iiboshi**, M. Ae, M. Suenaga, K. Miyashita (308)

CHANGE IN FUNCTIONS OF THE LOWER LIMB MUSCLES IN 100M SPRINT - **M. Ae**, A. Iiboshi, K. Miyashita, S. Ooki (313)

BRAKING HORIZONTAL MOMENTUM: A METHOD FOR DEVELOPING LEG POWER - **M.A. Ragheb** (317)

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THE RELATIONSHIP BETWEEN FORCE PRODUCED AGAINST OBJECTS OF DIFFERENT MOBILITY DURING STATIC AND DYNAMIC CONDITIONS - S. Kornecki, K. Kulig, W. Mularczyk, M. Trzcinski (365)

THE EFFECT OF OVERSPEED TRAINING ON SPRINTING SPEED - M.J.L. Alexander, R. Majdell (383)

BIOMECHANICAL DETERMINANTS OF THE RHYTHMIC STRUCTURE IN SPRINTERS START ACCELERATION - V.K. Balsevich (394)

STUDY OF INTERACTION CURVILINEARLY GLIDING SKATE BLADE WITH ICE - A.O. Minenkov, A.V. Ostroumov (426)

THE KINEMATICS AND KINETICS OF THE SHOULDER AND ELBOW JOINTS DURING THE VOLLEYBALL SPIKE - Chul Soo Chung (441)

TISSUE

A CONSTITUTIVE EQUATION FOR THE HUMAN DURA MATER ENCEPHALI - Zhu Xinghua, Shi Deguang, Liu Lei (9)

ACOUSTIC EMISSION DURING COMPRESSION FROM NORMAL AND DISEASED BONE - A. Bivas, I. Leichter, I. Roman, A. Simkin (30)

BIOMECHANICAL AND CT ANALYSIS OF TRIPLANAR FACIAL STRUT TRAUMA FOLLOWING STEERING WHEEL IMPACT - N. Yoganandan, F. Pintar, K. Chintapalli, J. Reinartz, A. Sances, Jr. (193)

IN VIVO STRESS RELAXATION OF THE LOADED FOOT - K.W. Misevich, F. Bojsen-Moller, E.B. Simonsen (210)

THE MECHANICS OF BIOLOGICAL POROUS MEDIA: THEORETICAL APPROACH AND NUMERICAL APPROXIMATION - S. Naili, O. Le Gallo, D. Geiger (262)

SYSTOLIC AND DIASTOLIC FORCE MEASUREMENTS OF MITRAL ANNULUS - Ru-Yi Zhang, Wang Ke-pang, Yu Jiao, Wang Yun-ru (325)

EXERCISE-RELATED ADAPTATION IN GEOMETRY AND MECHANICAL PROPERTIES OF IMMATURE RAT TIBIA AND VERTEBRA - G.J. Salem, Kung-Chia Li, R.F. Zernicke, R.J. Barnard (353)

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TISSUE (continued)

EFFECTS OF A HIGH-FAT/HIGH-SUCROSE DIET ON CORTICAL BONE REMODELING AND BIOMECHANICS - Kung-Chia Li, R.F. Zernicke, R.J. Barnard, A. F-Y. Li (369)

A NEW CONCEPT ABOUT THE SUPPORTING ORGAN OF THE MUSCULOSKELETAL SYSTEM - R.P. Dobrev, D.A. Djerov, V.K. Manova (407)

Session #1**Moore Hall - Room 100****Sport: Swimming**

Chairs: Mitsumasa Miyashita (Japan) -
Peter Milburn (Australia)

- 4:00 INTERACTION BETWEEN SWIMMING TECHNIQUE AND PERFORMANCE CAPACITY IN SWIMMING - **K.L. Keskinen**, P.V. Komi (83)
- 4:15 EFFECTS OF SPEED ON THE BIOMECHANICS OF FREESTYLE IN SWIMMING - **A.H. Rouard** (268)
- 4:30 AN INTERACTIVE COMPUTER SIMULATION AND OPTIMIZATION OF MULTI-LINK MODEL OF SWIMMING MOTION - **A.J. Komor** (400)
- 4:45 ACTIVE AND PASSIVE DRAG IN SWIMMING - **A.P. Hollander**, H.M. Toussaint, J.P. Troup (298)
- 5:00 BIOMECHANICS OF SHORT DISTANCE FIN SWIMMING TECHNIQUE AND THE OPTIMUM MATCH OF BODY-FIN - **Li Shuping** (390)
- 5:15 BEST INSTANT FOR TAKE-OFF FROM SPRINGBOARD - **Liu Tao**, Wu Xiufang (23)
- 5:30 THE MEASUREMENT AND ANALYSIS OF BODY SHAKING STATES - **J. Ding**, Dai. X. (21)

Session #2**Ackerman 2nd Floor Lounge****Spine**

Chairs: - Alf Thorstensson (Sweden) - Albert Schultz (USA)

- 4:00 MEASUREMENT OF NECK RANGE AND PATTERN OF MOVEMENT - **E.Y.S. Chao**, S. Tanaka, S. Korinek, T. Cahalan (319)
- 4:15 MECHANICAL STABILITY OF THE HUMAN LUMBAR SPINE - **A. Bergmark** (53)
- 4:30 ANALYSIS OF LOADS ON THE CANINE LUMBAR SPINE: AN EXPERIMENTAL AND THEORETICAL STUDY - **J.A. Ashton-Miller**, K.M. McGlashen (150)
- 4:45 BIOMECHANICS OF LUMBAR FACETECTOMY AND DISCECTOMY - N. Yoganandan, **F. Pintar**, J. Cusick, J. Reinartz (195)
- 5:00 SEXUAL DIFFERENCES OF THE NORMATIVE TYPOLOGY OF THE RACHIS CURVES AND ANALYSIS OF SPHEROSOMATOGRAMS OF FEMALE OLYMPICS CRAWL AND BUTTERFLY SWIMMERS - **Cz. Wielki** (38)

Session #3**Haines Hall - Room 39****Joint Kinematics and Kinetics**

Chairs: Jill McNitt-Gray (USA) - Keijo Hakkinen (Finland)

- 4:00 THE ROTATION CENTER OF THE GLENOHUMERAL JOINT - **F.C.T. van der Helm**, G.M. Pronk, H.E.J. Veeger, L.H.V. van der Woude (338)
- 4:15 MEASUREMENT OF UPPER LIMB ACTIVITY USING FLEXIBLE ELECTROGONIOMETERS - **T.M. Barker**, A.C. Nicol, I.G. Kelly (216)
- 4:30 DETERMINATION OF THE COMPOSITE AND INDIVIDUAL JOINT SIBUS CONES OF THE HUMAN SHOULDER COMPLEX - **A.E. Engin**, S.T. Turner (246)
- 4:45 MODELLING OF THE SHOULDER MECHANISM - **R.H. Rozendal**, H.E. Veeger, F.C.T. van der Helm, G.M. Pronk, L.H. van der Woude (177)
- 5:00 STRAIN OF CARPAL LIGAMENTS DURING WRIST-JOINT MOTION - **H.H.C.M. Savelberg**, J.G.M. Kooloos, R.Huiskes, J.M.G. Kauer (301)
- 5:15 A NEW APPROACH TO IDENTIFY KINEMATIC PECULIARITIES IN HUMAN MOTION - **F. Casolo**, G. Legnani (380)
- 5:30 INSTANTANEOUS CENTRE OF ROTATION OF THE KNEE DURING HUMAN GAIT - **D.A. Winter**, M.G. Ishac, S. Scott (240)

Session #4**Morgan Center Press Room****Electromyography**

Chairs: A.T. Hof (Holland) - Lars Larsson (Sweden)

- 4:00 EFFECT OF CADENCE ON THE EMG OF VASTUS LATERALIS AND OXYGEN UPTAKE DURING STEADY-STATE SUBMAXIMAL CYCLING - **B. Reimer**, D. Sanderson, K. Seburn (137)
- 4:15 USE OF SURFACE AND FINE WIRE ELECTROMYOGRAPHY IN THE STUDY OF LOWER EXTREMITY FLEXORS DURING CYCLING - **M. Ryan**, R.J. Gregor, B. Healy (451)
- 4:30 INFLUENCES OF ALPRAZOLAM ON EMG IN MAXIMAL VOLUNTARY EFFORTS - **J. Cabri**, J.P. Clarys, D.V. Vanderstappen (446)
- 4:45 QUANTIFICATION OF NEUROMUSCULAR-PROPAGATION FAILURE IN SINGLE MOTOR UNITS OF CATS DURING A FATIGUE TEST - **R.M. Enoka**, Y. Laouris, R.M. Reinking, N. Trayanova, L. Bevan, D.G. Stuart (109)
- 5:00 EFFECTS OF DISUSE ON SINGLE MOTOR UNITS IN HUMANS - **J. Duchateau**, K. Hainaut (290)
- 5:15 REINFORCEMENT OF MOTOR EVOKED POTENTIALS IN SPINAL CORD INJURED PATIENTS FOLLOWING TRANSCRANIAL MAGNETIC STIMULATION OF THE MOTOR CORTEX - **K.C. Hayes**, R. Allatt, D. Wolfe, W.F. Brown (148)
- 5:30 MEASUREMENTS OF MUSCLE FIBER CONDUCTION VELOCITY AT THE M. BICEPS AND M. TRICEPS BRACHII UNDER ISOMETRIC LOAD - **G.O. Hering**, E.M. Hennig, H.J. Riehle (225)

Session #1**Moore Hall - Room 100****Gait**

Chairs: Robert Soutas-Little (USA) -
Mario Lafortune (Australia)

- 8:00 THE CONCORDANCE BETWEEN MILD LEG LENGTH INEQUALITY AND GROUND REACTION FORCE DATA ASYMMETRY DURING RUNNING - **S.T. McCaw**, B.T. Bates, K.M. Singer (144)
- 8:15 THE DEVELOPMENT OF GAIT FROM THE VIEWPOINT OF TEMPORAL AND DISTANCE FACTORS - **Y. Takanashi**, H. Yano, M. Miyashita (332)
- 8:30 HAMSTRING LENGTH IN CROUCH GAIT - **G.T. Rab** (277)
- 8:45 BIOMECHANICS OF THE REARFOOT DURING WALKING IN HIGH AND LOW FAT FEMALES **S.P. Messier**, A.B. Davies (19)

Session #2**Ackerman 2nd Floor Lounge****Movement Control**

Chairs: Larry Abraham (USA) - Aftab Patla (Canada)

- 8:00 SEGMENTAL CONTRIBUTIONS TO TOTAL BODY MOTION IN SIT-TO-STAND - **Yi-Chung Pai** (186)
- 8:15 BIOMECHANICAL DETERMINANTS OF ABILITY TO RISE FROM A CHAIR - **A. Schultz**, N. Alexander, J. Ashton-Miller (218)
- 8:30 TURNING OUT OF RESONANCE DURING WALKING AND REQUIREMENTS OF FOOTWEAR - **M.R. Pitkin** (336)
- 8:45 AN ANALYSIS OF TRAJECTORY CONTROL STRATEGIES IN A GOAL ORIENTED THROWING TASK - **T.B. Hoshizaki**, T. Gallivan (292)

Session #3**Haines Hall - Room 39****Orthopaedics: Bone**

Chairs: Kai-Nan An (USA) - Magdalena Muller-Gerbl (FRG)

- 8:00 FEMORAL BONE ARCHITECTURE COMPUTED FROM 3-D MODELS RELATING BONE REMODELING TO STRESS HISTORIES - **T.E. Orr**, G.S. Beaupre, D.R. Carter (167)
- 8:15 ANALYSIS OF U.S. AND SOVIET EFFORTS TO MAINTAIN MUSCLE AND BONE MASS WITH EXERCISE DURING PROLONGED BEDREST AND SPACEFLIGHT - **R.T. Whalen**, D.R. Carter, C.R. Steele (143)
- 8:30 DOUBLE EXPOSURE HOLOGRAPHIC INTERFEROMETRIC EVALUATION OF PLATED FRACTURE SYSTEMS - **J.C. Shelton**, D. Gorman, W. Bonfield (61)
- 8:45 THE STRESS PROTECTION RATE OF BONE-PLATE SYSTEM - **Wang Yi-jing** (304)

Session #4**Morgan Center Press Room****Ergonomics**

Chairs: Klaus Nicol (FRG) - Patrick Bishop (Canada)

- 8:00 TOWARDS A 3D BIOMECHANICAL TORSO MODEL FOR ASYMMETRIC LOAD HANDLING - **D.B. Chaffin**, R.E. Hughes, M.A. Nussbaum (132)
- 8:15 MUSCULAR FATIGUE IN MTM-PACED WORK - **G. Sundelin**, M. Hagberg, U. Hammarstrom (350)
- 8:30 EFFECTS OF ASYMMETRICAL LOAD CARRYING ON GROUND REACTION FORCES DURING WALKING - **Der Ming Hong**, P. DeVita, J. Hamill (59)
- 8:45 FOUR FACTOR MODEL TO DESCRIBE AN ISOINERTIAL LIFT - **J.M. Stevenson**, J.T. Bryant, D.R. Greenhorn, S.L. French, G.M. Andrew (360)

Session #1

Moore Hall - Room 100

Sport

Chairs: Kazuhiko Watanabe (Japan) - Carole Zebas (USA)

- 11:00 EMG OF UP-HILL RACING - A NEW QUALITATIVE APPROACH OF CYCLIC MOVEMENTS - J.P. Clarys, J. Cabri, **J. Antonis**, (445)
- 11:15 KINETICS OF THE START IN SPEED SKATING - **J.J. de Koning**, G. de Groot, G.J. van Ingen Schenau (312)
- 11:30 THREE-DIMENSIONAL ORIENTATION OF THE HIPS AND SHOULDERS IN SPEED SKATING SPRINT STARTS - **M. Hartfel**, J. Swigart, S. Sandvig, A. Erdman, L.J. Stoner, N. Greer (395)
- 11:45 REGULATION OF STROKE FREQUENCY AND MECHANICAL WORK PER STROKE IN SPEED SKATING THE CURVES - **R.W. de Boer**, K.L. Nilsen (283)
- 12:00 BIOMECHANICAL CORRELATES OF FAST BOWLING AND BACK INJURIES IN CRICKET: A PROSPECTIVE STUDY - **B. Elliott**, D. Foster, D. John, T. Ackland, K. Fitch (16)

Session #2

Ackerman 2nd Floor Lounge

Muscle Function

Chairs: Robert Marshall (Australia) - Walter Herzog (Canada)

- 11:00 MATHEMATICAL MODEL OF KNEE JOINT EXTENSOR MUSCLES FATIGUE - K. Fidelus, **W. Musial**, M. Wychowanski (341)
- 11:15 THE EFFECT OF PRETENSION AND MUSCLE LENGTH ON THE PROCESSION OF KNEE EXTENSION - **J. Tihanyi** (359)
- 11:30 MECHANISMS UNDERLYING THE AGE-RELATED DECREASE IN SPEED OF CONTRACTION: AN EXPERIMENTAL STUDY OF FAST- AND SLOW-TWITCH MUSCLES, SINGLE MOTOR UNITS AND SKINNED MUSCLE FIBRES IN THE RAT - **L. Larsson**, L. Edstrom, G. Salvati (221)
- 11:45 MUSCLE FUNCTION IN PRIMARY FIBROMYALGIA - A PRELIMINARY STUDY - **G. Sundelin**, J. Elert, S. Rantapaa-Dahlquist, B. Gerdle, K. Henriksson-Larsen (227)

Session #3

Haines Hall - Room 39

Orthopaedics

Chairs: George Rab (USA) - Wang Shiou (P.R. China)

- 11:00 THREE-DIMENSIONAL KINEMATICS OF GLENOHUMERAL ELEVATION - **A.O. Browne**, K-N. An, S. Tanaka, B.F. Morrey (35)
- 11:15 MORPHOLOGICAL REACTION TO STRESS ACTING ON THE SHOULDER AND ACROMIOCLAVICULAR JOINT IN GYMNASTS - **M. Muller-Gerbl**, L. Schweizer, H-P. Boschert, R. Putz (47)
- 11:30 EFFECTS OF SYNERGISTIC WRIST MOTION ON FLEXOR TENDON EXCURSION IN THE HAND - G-T. Lin, **K-N. An**, P.C. Amadio, W.P. Cooney (33)
- 11:45 CINE/KINE MRI: A NEW TOOL FOR DYNAMIC ASSESSMENT OF WRIST DISORDERS - **B.R. Mandelbaum**, R.J. Gregor (430)

Session #4

Morgan Center Press Room

Gait

Chairs: Benno Nigg (Canada) - Tatsunuki Ohysuki (Japan)

- 11:00 CALF MUSCLE WORK AND SEGMENT ENERGY CHANGES IN RUNNING - **A.L. Hof**, D.P. Struwe, J. Nauta (322)
- 11:15 THE INFLUENCE OF SHOEING ON TENDON STRAIN IN THE EQUINE FORELEG - **A.J. van den Bogert**, D.J. Riemersma, M.O. Jansen, W. Hartman (347)
- 11:30 STANDING RADIOGRAPHIC MEASUREMENTS VS FORCE PLATE GAIT ANALYSIS OF MODERATE GONARTHROSIS - **O.K. Svensson**, L. Weidenhielm, L. Brostrom, J. Ekholm (340)
- 11:45 SYSTEM APPROACH TO BIOMECHANICS OF PARETIC GAIT CONTROLLED BY SUBCUTANEOUS ELECTRICAL STIMULATION - **M. Kljajic**, M. Malezic, R. Acimovic, J. Krajnik, A. Ahlin, M. Gregoric, E. Vavken (348)

Session #1

Moore Hall - Room 100

Sport

Chairs: Elizabeth Roberts (USA) - Jozsef Tihanyi (Hungary)

- 1:30 BIOMECHANICAL FACTORS AFFECTING ACCURACY IN PISTOL SHOOTING - **B.R. Mason**, L.F. Cowan, J. Bond (236)
- 1:45 COMPUTER PREDICTED OPTIMAL RELEASE CHARACTERISTICS FOR VARYING ABILITY FEMALE JAVELIN THROWERS - **R.J. Best**, R.M. Bartlett, R.A. Sawyer (269)
- 2:00 COMPARATIVE ANALYSIS OF DECATHLETE AND ELITE JAVELIN THROWERS - **S.L. Smith**, S.L. Werner (87)
- 2:15 AERODYNAMICS OF THE HUMAN BODY IN SPORTS - **R.A. Walpert**, C.R. Kyle (436)
- 2:30 RECENT ADVANCES IN ANALYSES OF THROWING **T.P. King**, R.L. Huston (40)
- 2:45 EFFECT OF HEAD POSITION ON BADMINTON PLAYERS' REACTION TIMES, MOVEMENT TIMES, AND KINEMATIC ELEMENTS OF RUNNING BACKWARD - **B. Gowitzke**, D.B. WADDELL, T.D. LEE, J.R. POOLE (103)
- 3:00 THE BIOMECHANICS OF TRAINING SPECIFICITY OF STANDING THROWS IN ATHLETICS - **A.H. Payne** (124)
- 3:15 STUDYING THE AERODYNAMICS OF LOW CENTRE OF GRAVITY JAVELINS - **Zhou Jihe** (74)

Session #2

Ackerman 2nd Floor Lounge

Movement Control

Chairs: Jack Winters (USA) - Albert Gollhofer (FRG)

- 1:30 EXTRINSIC FEEDBACK AND THE LEARNING OF CYCLING KINETIC PATTERNS - **J.P. Broker**, R.J. Gregor, R.A. Schmidt (452)
- 1:45 THE EFFECT OF ADDED LOAD ON LANDING STRATEGIES - **B.T. Bates**, B.L. Caster (58)
- 2:00 SEGMENTAL ENERGY CONTRIBUTIONS IN WALKING AND RUNNING - **G.E. Caldwell**, L.W. Forrester, S.J. Phillips, J.E. Clark (343)
- 2:15 INFLUENCE OF TIMING ON VERTICAL JUMPING PERFORMANCE: A SIMULATION STUDY - **A.J. van Soest**, P. Schermerhorn, P.A. Huijing, G.J. van Ingen Schenau (244)
- 2:30 TRANSCRANIAL MAGNETIC STIMULATION OF THE HUMAN BRAIN: EFFECTS OF STIMULUS LOCATION - **O. Kameyama**, K.C. Hayes, P. Johnson, D. Wolfe, R. Allatt, J. Hsieh (146)
- 2:45 POSTURE-RELATED MODULATIONS OF LIMB DYNAMICS DURING SPONTANEOUS KICKING IN INFANTS - **K. Schneider**, R.F. Zernicke, J.L. Jensen, B.D. Ulrich, E. Thelen (370)

Session #3

Haines Hall - Room 39

Orthopaedics

Chairs: Bert Mandelbaum (USA) - Sylvia Ounpuu (USA)

- 1:30 INTERTESTER AND DAY TO DAY VARIATION OF KNEE JOINT LAXITY CHARACTERISTICS AS MEASURED BY THE GENUCOM - **T.B. Hoshizaki**, S. Matthews (292)
- 1:45 ON THE BIOMECHANICAL NONSENSE OF PRIMARY ARTHROSCOPIC ACL-SUTURES - **M.A. Scherer**, R. Ascherl, T. Brunner, H.J. Fruh, T. Brill, W. Siebels, G. Blumel (300)
- 2:00 ASSESSMENT OF KNEE JOINT POSITION SENSE FOLLOWING SURGICAL RECONSTRUCTION FOR ANTERIOR CRUCIATE LIGAMENT INSUFFICIENCY **R.A. Harter** (104)
- 2:15 THE EFFECTS OF INTERNAL TIBIAL DEROTATIONAL OSTEOTOMIES ON GAIT IN CHILDREN WITH CEREBRAL PALSY - **S. Ounpuu**, M. Andrews, J.R. Gage (160)

Session #4

Morgan Center Press Room

Joint Kinematics & Kinetics

Chairs: Peter Cavanagh (USA) - Joe Hamill (USA)

- 1:30 EFFECT OF FOOT ORTHOTICS ON THE KINEMATICS OF THE KNEE JOINT - **J.J. Eng**, M.R. Pierrynowski (14)
- 1:45 INTERNAL STRUCTURE LOADING IN THE KNEE JOINT: A BIOMECHANICAL APPLICATION OF OPTIMIZATION THEORY - **L.M. Schutte**, R.W. Soutas-Little (96)
- 2:00 VARIATION OF MEDIAL AND LATERAL PLATEAU LOADS AT THE KNEE JOINT WITH DIFFERENT LEVER ARMS OF THE GROUND REACTION FORCE VECTOR - **H. Lanshammar** (281)
- 2:15 A MODEL OF ANTERIOR CRUCIATE LIGAMENT INJURY IN ALPINE SKIERS - **L. Read**, W. Herzog (188)
- 2:30 SPECTRAL ANALYSIS OF LOWER BODY KINETICS DURING SELECTED ACTIVITIES - **G.S. Rash**, R. Shapiro, C.F. Knapp (91)
- 2:45 THE EXPERIMENTAL STUDY ON THE DYNAMIC HORIZONTAL FORCE OF THE LOWER LIMBS OF DASH ATHLETE - **Y. Qingcheng**, Z. Jihao, Z. Guangfu, S. Zhongying (18)