VIRTUAL ESMAC 2020

www.esmac2020.org
Introduction to Poster Session

09:00 - 09:10

**Imaging/Modelling**

Poster Session: Imaging and Modelling Posters

09:15 - 10:15

<table>
<thead>
<tr>
<th>Poster</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>P004 - P014</td>
<td>Modelling and simulation</td>
<td>A. Massaad, E. Saad, R. Rachkidi, G. Kawkabani, R.M. Saliby, M. Mekhail, I. Ghanem, K. Kharrat, V. Lafage, A. Assi (Lebanon)</td>
</tr>
<tr>
<td>P015 - P015</td>
<td>Sports and sports injury</td>
<td>S. Ozyurek, A.C. Kalkan, H.M. Bulbul, M.A. Kamar, A. Balcı, E. Dogan, A.O. Ikiz, P. Keskinoglu, A. Genc (Turkey)</td>
</tr>
<tr>
<td>P001</td>
<td>The correlation of hamstring muscle functionality with hamstring muscle strength and ultrasound based hamstring muscle architecture parameters</td>
<td>F. Bagheri, H. Barnamehei, M.R. Kharazi, A. Panahi, N. Golfeshan, M. Razaghi, M. Rostami, M. Barnamehei, N. Naghavi, S. Azad Jafarloo (Iran (Islamic Republic of))</td>
</tr>
<tr>
<td>P002</td>
<td>Sitting postural alignment and relationship with quality of life in Adult Spinal Deformity</td>
<td>E. De Pieri, J. Romkes, C. Wyss, C. Weidensteiner, E. Rutz, M. Garcia, R. Brunner (Switzerland)</td>
</tr>
<tr>
<td>P003</td>
<td>Trapezius muscle thickness measured by ultrasonography and its relation to shoulder motions and scapular muscle endurance after neck dissection</td>
<td>A. Ciniglio, A. Guiotto, Z. Sawacha (Italy)</td>
</tr>
</tbody>
</table>
P008 Predicting changes in the range of motion limitation of whiplash injured using neural networks
A. Fidalgo Herrera, M.J. Martínez-Beltrán, J.C. de la Torre.Montero, G. Barton (Spain)

P009 Muscles kinetics effect on the generation of proximal to distal tasks: simulation of the knife hand block movement via OpenSim
N. Golfeshan, M. Barnamehei, A. Rezaei, H. Barnamehei, M.R. Kharazi, M.A. Safaei (Iran (Islamic Republic of))

P010 Quantitative estimation of the effectiveness of plantar foot orthosis: a FEM approach
A. Guiotto, M. Galuppo, G. Sartorato, Z. Sawacha (Italy)

P011 Muscle-tendon unit length-spastic muscle force data by combined intraoperative-musculoskeletal modelling work
C.S. Kaya, C.A. Yucesoy (Turkey)

P012 Sensitivity evaluation of a musculoskeletal hand model using Latin hypercube sampling
M. Melzner, L. Engelhardt, F. Suß, S. Dendorfer (Germany)

P013 A musculoskeletal model to perform high knee flexion tasks: application to ACL injury prevention.
D. Pavan, E. Giacomini, S. Van Rossom, H. Hoang, I. Jonkers, Z. Sawacha (Italy)

P014 The effect of simplifying scaling methods of an upper limb musculoskeletal model on the joint angles
R. Readioff, D. Blana, D. Mulla, F. Philp, N. Postans, E. Chadwick (United Kingdom)

P015 Upper body postures effect on neuromuscular activities of the lower limb during a squat: musculoskeletal modeling
**Movement Analysis**

Poster Session: Movement Analysis Posters

09:15 - 10:15

| P016 - P017 | Clinical reasoning and evidence |
| P018 - P021 | Coordination and motor control |
| P022 - P022 | Foot and ankle |
| P023 - P041 | Movement analysis methodology |
| P042 - P044 | Musculoskeletal disorders |
| P045 - P045 | Upper extremity and trunk |
| P046 - P046 | Sports and sports injury |

- **P016** Explaining automated gender classification of human gait  

- **P017** Influence of step width on the hip adduction moment during gait  
  F. Stief, J. Holder, Z. Feja, A. Lotfohlapour, A. Meurer, J. Wilke (Germany)

- **P018** There is a time shift between muscle synergies and kinematic synergies during normal gait  
  S. Esmaeili, H. Karami, M. Baniasad, M. Shojaee fard, F. Farahmand (Switzerland)

- **P019** Biofeedback-driven gaming to reduce muscle stretch reflexes  
  E. Flux, R.C. van 't Veld, M.M. van der Krogt, E.H.F. van Asseldonk (Netherlands)

- **P020** Dysmenorrhea and multitasking ability  
  H. Keklicek, N. Seremenli Aydin, H.B. Can, D. Dönmez Aydin, A.Z. Yılmazer Kayatekin, E. Uluçam (Turkey)

- **P021** Immediate effect of scapular stabilisation exercises on shoulder and forearm muscles activation while playing the violin  
  C. Rousseau, J.Y. Chi, B. Ackermann (United Kingdom)

- **P022** Ankle Kinesio taping impacts on lower limbs biomechanics during countermovement jump among collegiate athletes with chronic ankle instability  
  J. Sarvestan, Z. Kovacikova, Z. Svoboda, A. Needle (Czech Republic)

- **P023** Does neuromuscular electrical stimulation have an effect on disability, pain, abdominal and lumbar muscle thickness in chronic low back pain?  
  E. Atli, D. Karagözoğlu Coşkunsu, O. Ozyemisci Taskıran, Z. Turan (Turkey)

- **P024** Reliability of a dynamic calibration approach to 3DMA and comparison to standard methods.  
  A. Carman (New Zealand)
Evaluating 3D free-hand ultrasound as an alternative approach to register anatomical landmarks: a test-retest study in lean and overweight participants
S. Durstberger, C. Schwab, M. Simonlehner, H. Kainz, A. Kranzl, B. Horsak (Austria)

Potential use of a Smartphone test to assess balance and risk of falls among Parkinson disease' patients
M. Inglés, M. Aguilar-Rodríguez, N. Sempere-Rubio, P. Serra-Añó (Spain)

Sensitivity analysis of the SCoRE and SARA Methods for determining rotational axes during tibiofemoral movements using optical motion capture
M. Keizer, E. Otten (Netherlands)

Investigations of the effects of wearing twister on gait biomechanics in children with increased femoral anteversion: A Plot Study
F. Kiliç, N.E. Akalan, R. Sert, C. Sardoğan, K. Önerge, F. Bilgili (Turkey)

Validity and reliability of horizontal measurement for head repositioning accuracy by laser
A. Köseoğlu, D. Karagözöglu Coşkunsu, E. Kaya Mutlu (Turkey)

Different TOE-marker positions result in relevant alterations of foot kinematics
B.K. Krautwurst, J. Schäfer, T. Dreher (Switzerland)

Estimation of the hip joint centre in children with cerebral palsy
O. Ozturk, F. Salami, M. Götze, I. Demirbüken, M.G. Polat, S. Wolf (Germany)

Reliability of a simplified kinematic model for clinical gait analysis.
S. Pitarch-Corresa, C. Herrera-Ligero, J.Y. Torres-Villanueva, E. Medina-Ripoll, F. Parra-González, J. López-Pascual (Spain)

Gait variability using waist- and ankle-worn inertial measurement units in healthy older adults
T. Rantalainen, L. Karavirta, T. Rantanen, V. Linnamo (Finland)

Estimation of lower limb segment orientation using Motion Envelopes: A preliminary study
I. Roupa, S.F. Paulo, S.B. Gonçalves, M. Tavares da Silva, D.S. Lopes (Portugal)

The feasibility of automated detection of the aligned trunk in sitting directly from raw video using a depth camera
M.B. Sánchez, R. Cunningham, P. Butler, I. Loram (United Kingdom)

Evaluating the accuracy of a 3D free-hand ultrasound technique for bone segmentation in clinical gait analysis
C. Schwab MSc, S. Durstberger, A. Kranzl, M. Simonlehner, H. Kainz, B. Horsak (Austria)

Simple method for correcting hip joint center position in overweight subjects
P. Swennen, V.S. Högerle, D.W. Heitzmann, S.I. Wolf (Germany)

Using deep learning to track 3D kinematics
M. Van Den Bogaart, S.M. Bruijn, J. Spildooren, J.H. van Dieën, P. Meyns (Belgium)
P039 The SWING test: a more reliable test than clinical passive tests for assessing hip sagital mobility.
C. Vassant, K. Rose-Dulcina, N. Lauper, D.E. Dominguez, S. Armand (Switzerland)

P040 Effect of sex and neck length on cervical kinematics: a functional data analyses approach
V. William, M. Inglés, Á. Page, P. Serra-Añó (Spain)

P041 Symmetry function corresponds well to statistical parametric mapping dynamical measure of symmetry
S. Winiarski, S. Jaroszczuk, K. Aleksandrowicz (Poland)

P042 Speed-related differences in walking pattern revealed by statistical parametric mapping
S. Winiarski, S. Jaroszczuk, B. Pietraszewski (Poland)

P043 Evaluation of thoracic kyphosis and lumbar lordosis in adolescents
B.B. Kılıç, H. Akgül, T. Kuru Çolak (Turkey)

P044 3D gait analysis along with classic radiographic assessment in Adult Spinal Deformity can explain 90% of quality of life outcomes
R.M. Saliby, G. Kawkabani, M. Mekhael, A. Massaad, E. Saad, R. Rachkidi, I. Ghanem, G. Kreichati, V. Lafage, A. Assi (Lebanon)

P045 Effect of medial-lateral hand positions on glenohumeral and acromioclavicular joint kinematics during push-up exercise
N. Golfeshan, S. Fatemigarakani, F. Aflatounian, A. Fattahzadeh, A. Maboudmanesh, T. Vojdani, A. Shaabani, N. Naghavi, M.A. Safaei, H. Barnameheei (Iran (Islamic Republic of))

P046 Acute effects of different whole-body-vibration frequencies on shoulder stability
M. Morikawa, Y. Urabe, S. Kotoshiba, M. Yoshimi, N. Maeda (Japan)
Paediatric Disorders
Poster Session: Paediatric Disorders Posters

09:15 - 10:15

P047 - P052  Clinical reasoning and evidence
P053 - P053  Coordination and motor control
P054 - P056  Foot and ankle
P057 - P061  Musculoskeletal disorders
P062 - P062  Normative studies
P063 - P079  Paediatric neurological disorders
P080 - P080  Robotic and assistive devices

P047  Spatio-temporal parameters and body of gait and body deformations in patients with osteogenesis imperfecta
K. Graff, M. Kalinowska, E. Szczterbik, M. Jaworski, E. Jakubowska-Pietkiewicz, E. Jelonek, M. Syczewska (Poland)

P048  Prediction of outcome after selective dorsal rhizotomy remains challenging in children with cerebral palsy.
C. Huenaerts, K. Desloovere, E. Papageorgiou, G. Molenaers, T. Maxine, J. Truyers, A. Van Campenhout (Belgium)

C. Huenaerts, K. Desloovere, H. Schreurs, A. Van Campenhout (Belgium)

P050  Investigation the effects of reading-tasking on gait parameters in healthy children
K. Onerge, N.E. Akalan, R. Sert, H. Evrendilek, G. Gurkan, M. Caliskan, F. Bilgili (Turkey)

P051  Investigation of the relationship between plantar pressure behaviour and plantar surface sensitivity in children with idiopathic toe walking
K. Onerge, R. Sert, N.E. Akalan, F. Bilgili (Turkey)

P052  Pattern-specific hypotheses based on multiple joint gait patterns to identify the optimal candidates for selective dorsal rhizotomy.
E. Papageorgiou, E. Ortibus, K. Desloovere, A. Van Campenhout (Belgium)

P053  Dynamic knee valgus in preschool children – a cross-sectional study on 458 children using markerless motion capturing technology
S. Harsted, L. Hestbæk, A. Holsgaard-Larsen, H. Hein Lauridsen (Denmark)

P054  Relationship between different methods to measure ankle range of motion in children with idiopathic toe walking
M. Gwerder, M. Shiraishi, C. Hoang, R. Soangra, R. Beuttler, A. Aminian, M. Grant-Beuttler (Switzerland)

P055  Idiopathic toe-walking children utilise a similar portion of their moment-angle curve during gait as typically developing children
C. Harkness-Armstrong, C. Maganaris, R. Walton, D. Wright, A. Bass, V. Baltzopoulos, T. O'Brien (United Kingdom)
<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>P056</td>
<td>Differences in total gait quality of clubfoot patients with and without relapse when compared to healthy children</td>
<td>S. Wijnands, A.T. Besselaar, L. Grin, L. van Oorschot, B. Vanwanseele, M.C. van der Steen (Belgium)</td>
</tr>
<tr>
<td>P058</td>
<td>Investigation of the effects of insoles depending on hypermobility in children with increased femoral anteversion</td>
<td>H. Evrendilek, N.E. Akalan, S. Kuchimov, K. Onerge, G. Karaca Yilmaz, G. Erturk Uzunoglu, F. Bilgili (Turkey)</td>
</tr>
<tr>
<td>P059</td>
<td>Disease-specific gait deviations in pediatric patients with X-linked hypophosphatemic rickets</td>
<td>A. Kranzl, A. Raimann, A. Stauffer, G. Haeusler, R. Ganger, G. Mindler (Austria)</td>
</tr>
<tr>
<td>P060</td>
<td>Analysis of foot plantar pressure behavior of children with obstetric brachial plexus paralysis</td>
<td>Y. Ozdemir, N.E. Akalan, S. Kuchimov, K. Onerge, S. Çolak, B. Dilek, S. Özkan (Turkey)</td>
</tr>
<tr>
<td>P063</td>
<td>Does therapeutic yoga have an impact on flexibility of bi-articular muscles of lower extremities in children with spastic cerebral palsy?</td>
<td>D.M. Ahmed, E. Waly, N. Mohamed (Egypt)</td>
</tr>
<tr>
<td>P065</td>
<td>Investigation of the effects of sensory processing problems on gait in children with cerebral palsy</td>
<td>M. Celik, N.E. Akalan, F. Bilgili (Turkey)</td>
</tr>
<tr>
<td>P066</td>
<td>Exploring visual feedback modalities in Augmented Reality to control the walking speed of children with cerebral palsy. Experimental design protocol.</td>
<td>A.L. Guinet, K. Neijib, S. Otmane, G. Bouyer, E. Desailly (France)</td>
</tr>
<tr>
<td>P067</td>
<td>Exploring visual feedback modalities in Augmented Reality to control the walking speed. Feasibility study.</td>
<td>A.L. Guinet, G. Bouyer, S. Otmane, N. Khouri, E. Desailly (France)</td>
</tr>
</tbody>
</table>
P068 Asymmetric gait results in symmetric muscular demands in affected versus unaffected side ankle and knee extensors in hemiplegic CP children
J.P. Kulmala, P. Haakana, J. Nurminen, Y. Elina, T. Niemelä, E. Marttinen-Rossi, H. Mäenpää, H. Piitulainen (Finland)

P069 Variance accounted for by one synergy lacks correlation with dyskinesia severity in children with cerebral palsy during upper limb activities
M.G.Y. Louey, E. Passmore, D. Grayden, A. Harvey, M. Sangeux (Australia)

P070 Development of a novel non-contact intra-operative measurement system for guiding femoral derotation osteotomies
S. McCormack, R. Walton, D. Wright, A. Bass, R. Foster, A. Eleuteri, A. Shortland, G. Barton (United Kingdom)

P071 Objective measurement of sitting, using pressure mapping. Clinical application in children with cerebral palsy.
M. Nyström Eek, K. Lindh, K. Himmelmann (Sweden)

P072 The gait is less stable in children with cerebral palsy in normal and dual-task gait
H. Piitulainen, J.P. Kulmala, H. Mäenpää, T. Rantalainen (Finland)

P073 Cortical proprioceptive processing is altered in children with diplegic cerebral palsy
H. Piitulainen, T. Nurmi, J. Vallinoja, J. Jaatela, E. Ylitalo, H. Mäenpää
(Finland)

P074 Accuracy and comparison of sensor-based gait speed estimations under laboratory and daily life conditions in children undergoing rehabilitation
F. Rast, S. Aschwanden, R. Labruyère (Switzerland)

P075 Accuracy of sensor-based classification of clinically relevant motor activities in daily life of children with mobility impairments
F. Rast, F. Jucker, R. Labruyère (Switzerland)

P076 Investigation of selective motor control problems gait alteration related for children with cerebral palsy
C. Sardoğan, N.E. Akalan, R. Muammer, R. Sert, F. Bilgili (Turkey)

P077 The relationship between the Edinburgh Visual Gait Score and Gait Deviation Index
C. Sardoğan, N.E. Akalan, R. Sert, K. Önerge, F. Bilgili (Turkey)

P078 Effects of plantar flexor muscle weakness on children with spastic cerebral palsy – pilot study
R. Sert, N.E. Akalan, K. Önerge, C. Sardogan, F. Bilgili (Turkey)

P079 An explorative study on the nature of impaired motor development in late preterm infants at 4 months corrected age
S. Uzer, B. Delişiğlu, Y.C. Wu, N. Duman, M. Hadders-Algra (Turkey)

P080 Robot-assisted therapy for upper extremity rehabilitation in Erb-Duchenne palsy: a case report
I. Akgün, E.E. Avci, E. Timurtaş, I. Demirbüken, M.G. Polat (Turkey)
Adult/Ageing
Poster Session: Adult/Ageing Posters

09:15 - 10:15

P081 - P087  Adult neurological disorders
P088 - P088  Clinical reasoning and evidence
P089 - P090  Coordination and motor control
P090 - P091  Elderly
P092 - P093  Foot and ankle
P094 - P096  Normative studies
P097 - P097  Physical activity methodology
P098 - P098  Robotic and assistive devices
P099 - P099  Sports and sports injury
P100 - P102  Stability and fall risk
P103 - P104  Upper extremity and trunk

P081 Differences in the way Parkinson's and control participants increase walking speed
E. Aldayil, A. Kerr (United Kingdom)

P082 Ambulation and cognitive factors associated with muscle function in adults with spina bifida
M. Bendt, E. Butler Forslund, E. Franzén (Sweden)

P083 Investigation of scapular dyskinesis and trapezius muscle thickness after neck dissection in patients with head and neck cancer
A.C. Kalkan, S. Ozyurek, H.M. Bulbul, M.A. Kamar, A. Balci, E. Dogan, A.O. Ikiz, P. Keskinoglu, A. Genc (Turkey)

P084 EMG analysis across different tasks improves prevention screenings in diabetes.
W. Piatkowska, F. Spolaor, A. Guiotto, C. Guarneri, A. Avogaro, Z. Sawacha (Italy)

P085 Reliability of strain analyses on the supraspinatus muscle in patients with multiple sclerosis

P086 Very high frequency versus low & high frequency Subthalamic Deep Brain Stimulation on gait in Parkinson's disease: A preliminary study
M. Yanardag, E.G. Yiğit Tekkanat, N. Durmaz Çelik, S. Ozkan, M. Vural, Ş. Torun (Turkey)

P087 Emotion and brain state based freezing of gait occurrence analysis with electroencephalography data

P088 Effect of ankle sprain Brostrom surgery on the lower extremity kinematics chain during sit-to-stand task
A. Aminishahsavarani, H. Barnameheizi, F. Khazaee, E. Karimi, M. Beigi,
<table>
<thead>
<tr>
<th>ID</th>
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</tr>
</thead>
<tbody>
<tr>
<td>P089</td>
<td>Analysis of gait adaptation pattern according to the change of slope angle during walking in young non-disabled adults.</td>
<td>D. Park, J. Lim, D.W. Rha (Korea (Republic of))</td>
</tr>
<tr>
<td>P090</td>
<td>The effect of accessing workplace heights on plantar pressure distribution in elderly</td>
<td>S. Atreya, U. Sharma, S. Anand (India)</td>
</tr>
<tr>
<td>P091</td>
<td>Sagittal spinal malalignment is the main driver of gait alterations in Adult Spinal Deformity</td>
<td>E. Saad, G. Kawkabani, R. Rachkidi, R.M. Saliby, M. Mekhail, A. Massaad, I. Ghanem, V. Lafage, W. Skalli, A. Assi (Lebanon)</td>
</tr>
<tr>
<td>P093</td>
<td>The influence of estrogen levels across the menstrual cycle on plantar loading and dynamic postural control in healthy females.</td>
<td>E.E. Avcı, E. Senocak, I. Akgün, E. Timurtaş, I. Demirbüken, M.G. Polat (Turkey)</td>
</tr>
<tr>
<td>P094</td>
<td>Effects of fatigue on spatiotemporal characteristics of healthy individuals</td>
<td>A. Demirel, D. Onan, O. Ulger (Turkey)</td>
</tr>
<tr>
<td>P095</td>
<td>Calculation of pressure sensor-based normative gait and posture parameters in healthy subjects</td>
<td>C. Sağlam, A. Vural, I. Solaroğlu, K. Akar (Turkey)</td>
</tr>
<tr>
<td>P096</td>
<td>Usability of modified tandem walking test for vestibular hypofunction diagnosis in young adults</td>
<td>E. Şenocak, K. Gamze, C. Çelikyurt, A. Aktürk (Turkey)</td>
</tr>
<tr>
<td>P097</td>
<td>The effects of two different supervised exercise trainings on aerobic capacity and pulmonary functions in type 2 diabetes</td>
<td>E. Senocak, E. Timurtaş, I. Demirbüken, Y. Sertbaş, M.G. Polat (Turkey)</td>
</tr>
<tr>
<td>P099</td>
<td>The difference of muscle fatigue in forearm during propelling a wheelchair with and without a badminton racquet</td>
<td>K. Fukui, U. Yukio, M. Noriaki, M. Masanori, S. Junpei (Japan)</td>
</tr>
<tr>
<td>P100</td>
<td>Investigation the effect of Graston Technique on strength and postural stabilization in individuals with asymptomatic dynamic knee valgus.</td>
<td>P. Pişirici, B.U. Şakul (Turkey)</td>
</tr>
<tr>
<td>P102</td>
<td>The relationship between sit-to-stand task and fat tissue &amp; lean body mass.</td>
<td>M. Barnamehei, N. Golfeshan, N. Naghavi, M. Barnamehei, M.R. Kharazi (Iran (Islamic Republic of))</td>
</tr>
</tbody>
</table>
P103 Effect of low-intensity and slow-movement shoulder external rotation exercise on muscle contraction characteristics in the infraspinatus muscle
S. Kotoshiba, Y. Urabe, M. Morikawa, M. Yoshimi, N. Maeda (Japan)

P104 Alteration of sitting and standing kinematics and its impact on quality of life in Adult Spinal Deformity
E. Saad, G. Kawkabani, R.M. Saliby, M. Mekhail, E. Jaber, S. Jabre, I. Ghanem, R. Rachkidi, V. Lafage, A. Assi (Lebanon)

AGM

10:30 - 11:00
Annual General Meeting and when it opens a short description: Annual General Meeting for ESMAC members.

Awards and Introduction to Oral Sessions

11:45 - 12:00 Room 1
**Imaging/Modelling**

Plenary Session: Imaging and Modelling

12:00 - 13:00

Chair: Zimi Sawacha (Italy)
Chair: Lynn Bar-On (Netherlands)

12:00 Invited Speaker: Ilse Jonkers  I01
12:10 **An EMG-informed modelling approach to estimate muscle forces and activations in Parkinson’s disease subjects**
Speaker: Marco Romanato (Italy)  O01

12:20 **A neuromechanical model that accounts for history-dependent muscle mechanics can identify individual-specific neural contributions to joint hyper-resistance.**
Speaker: Jente Willaert (Belgium)  O02

12:30 **Lack of hip and knee joint extension in children with cerebral palsy contribute to pathological femoral bone growth**
Speaker: Hans Kainz (Austria)  O03

12:40 **Influence of TAL-TATS surgery on energy production of Triceps Surae - a musculoskeletal modeling evaluation**
Speaker: Rosa Visscher (Switzerland)  O04

12:50 **Medial gastrocnemius muscle and tendon interaction during gait in typically developing children and children with cerebral palsy**
Speaker: Francesco Cenni (Belgium)  O05

**Movement Analysis**

Plenary Session: Movement Analysis

13:15 - 14:15

Chair: Anders Holsgaard-Larsen (Denmark)
Chair: Morgan Sangeux (Australia)

13:15 Invited Speaker: John Henley (USA)  I02
13:25 **Deep learning for automated pose estimation of infants at home from smart phone videos**
Speaker: Elyse Passmore (Australia)  O06

13:35 **Automatic video tracking using deep learning in dyskinetic cerebral palsy**
Speaker: Helga Haberfehlner (Netherlands)  O07
13:45  Markerless movement tracking using a machine-learning algorithm to assess arm movements during gait in children with HIV encephalopathy
Speaker: Maaike Eken (South Africa)  
13:55  Approaching human precision on automatic markerless tracking of human movements
Speaker: Daniel Groos (Norway)  
14:05  Uncertainty about uncertainty: ±5° might not mean what you think
Speaker: Elizabeth Boyer (USA)  

*Paediatric Disorders*
Plenary Session: Paediatric Disorders  
14:30 - 15:30  
Chair: Martin Švehlík (Austria)  
Chair: Marije Goudriaan (Netherlands)  
14:30  Invited Speaker: Bernard Dan  
14:40  Idiopathic toe-walking children have an increased plantarflexor effective mechanical advantage compared to typically developing children
Speaker: Carla Harkness-Armstrong (United Kingdom)  
14:50  Aggressive spasticity management during childhood does not result in improved quality of life among adults with cerebral palsy
Speaker: Meghan Munger (USA)  
15:00  The effect of prolonged moderate-intensity walking on muscle fatigue and neuromuscular control in children with cerebral palsy
Speaker: Sanne Ettema (Netherlands)  
15:10  Videogame-based balance training while standing does not affect reactive gait stability after slip perturbations in children with cerebral palsy
Speaker: Pieter Meyns (Belgium)  
15:20  Longitudinal alterations of gait features in growing boys with Duchenne muscular dystrophy
Speaker: Ines Vandekerckhove (Belgium)
Adult/Ageing
Plenary Session: Adults/Ageing

15:45 - 16:45

Chair: Ayman Assi (Lebanon)
Chair: Han Houdijk (Netherlands)

15:45 Invited Speaker: Sebastian Wolf (Germany) I04
15:55 Walk this way: elderly walk like the young, just more slowly
Speaker: Lizeth Sloot (Germany) O16
16:05 Lower-limb coordination during gait: the effects of age and walking
surface.
Speaker: Patrick Ippersiel (Canada) O17
16:15 How do people after stroke adapt step parameters and margins of
stability at different walking speeds?
Speaker: Laura Hak (Netherlands) O18
16:25 One session of Split-Belt Treadmill Training can affect gait adaptation
in people with Parkinson’s disease and Freezing of Gait
Speaker: Jana Seuthe (Germany) O19
16:35 Factors associated with walking activity in adults with cerebral palsy
Speaker: M Wade Shrader (USA) O20

Introduction to Poster Session

16:45 - 16:55

Imaging/Modelling
Poster Session: Imaging and Modelling Posters

17:00 - 18:15

P105 - P106  Foot and ankle
P107 - P109  Imaging and anatomy
P110 - P111  Modelling and simulation
P112 - P113  Movement analysis methodology
P114 - P114  Musculoskeletal disorders
P115 - P116  Prosthetics and orthotics
P117 - P117  Robotic and assistive devices
P118 - P118  Upper extremity and trunk
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>P106</td>
<td>Marker placement sensitivity in the Oxford and Rizzoli Foot Models in adults and children</td>
<td>W. Schallig MSc, J. van den Noort, G. Streekstra, Maas, J. Harlaar, M. van der Krogt (Netherlands)</td>
</tr>
<tr>
<td>P110</td>
<td>Cervical spine intervertebral kinematics estimated from inverse kinematics and compared to dynamic X-ray data</td>
<td>H. Barnameheij, Y. Zhou, X. Zhang, A. Vasavada (USA)</td>
</tr>
<tr>
<td>P114</td>
<td>Impact of a combination of functional adaptations on the lower limb joints using a visual feedback approach</td>
<td>T. Legrand, N. Equey, H. Younesian, A. Campeau-Lecours, K. Turcot (Canada)</td>
</tr>
<tr>
<td>P115</td>
<td>3D-printed foot prosthesis during gait: comparison with two standard prostheses</td>
<td>S. Hitzeroth, M. Rehg, A. Hogan, U. Trinler (Germany)</td>
</tr>
<tr>
<td>P116</td>
<td>Applicability and usability of an immersive virtual reality-based balance control exergame for prosthetic users: a pilot study with healthy individuals</td>
<td></td>
</tr>
</tbody>
</table>

P117 Resistance-as-needed (RAN) control for a wearable and soft hand exoskeleton
X. Xiong, P. Manoonpong (Denmark)

P118 Chest wall motion capture as a reliable method for assessing pulmonary function in idiopathic scoliosis
K. Nicholson, J. Salazar-Torres, P. Gabos, F. Miller, J. Henley, S. Shah (USA)

Movement Analysis
Poster Session: Movement Analysis Posters

17:00 - 18:15

P119 - P131 Movement analysis methodology
P132 - P133 Musculoskeletal disorders
P134 - P135 Normative studies
P136 - P137 Physical activity methodology
P138 - P139 Prosthetics and orthotics
P140 - P143 Sports and sports injury
P144 - P145 Upper extremity and trunk

P119 Can the ground reaction vector be an alternative to conventional gait model to estimate knee adduction moment?
M. Baniasad, M. Shojaee Fard, F. Farahmand, K. Aminian (Switzerland)

P120 Reliability and repeatability of real world data gait analysis in children
A. Ciniglio, F. Michieletto, F. Cibin, F. Spolaor, A. Guiotto, Z. Sawacha (Italy)

P121 Analysis of the effects of technical marker location on kinematic analysis using a 4D body scanner
H. Del Rosario Martínez, A.V. Ruescas Nicolau, E. Parrilla Bernabé, D. Garrido Jaén, J. López Pascual (Spain)

P122 Gait analysis driven cluster analysis of diabetic patients: novel subgroups and their association with clinical outcomes in a 15-years follow-up
A. Guiotto, M. Soldan, F. Silvestri, F. Spolaor, G. Guarneri, A. Avogaro, Z. Sawacha (Italy)

P123 Examination of differences in backward walking within a young and an old population: A quantitative cross-sectional survey.
F. Lindskog, H. Axelsson, R. Tranberg, L. Kollén, M. Tullberg, R. Zügner (Sweden)

P124 Ground reaction forces of two twins during gait: one healthy and one with spastic cerebral palsy
M. Marchitto, S. Otmani, B. Watier (France)
The effect of habituation on differences in energy cost between overground and treadmill walking in typically developing children
L. Oudenhoven, S. Ettema, A. Dallmeijer, E. Muselaars, A. Buizer, M. van der Krogt (Netherlands)

Reliability intra- and inter-assessor of the conventional gait model: a single center-based study.
A. Poulion Laforte, A. Parent, Y. Cherni, B. Sinclair, L Ballaz (Canada)

Estimation of a midfoot joint centre in typically developed adults using functional calibration methods
F. Salami, J. Leboucher, M. Götze, S. Hagmann, S.I. Wolf (Germany)

A comparison of clinically and kinematically identified spatio-temporal parameters in cerebral palsy gait

Taking a moment to consider the medial knee thrust: gait modifications to reduce the 3D knee moment.
H. Shepherd, G. Barton, M. Robinson, L. Ranganath (United Kingdom)

Feature selection from markerless movement recordings to assess dystonia in children with cerebral palsy.

A multi-task, multi-center motion analysis protocol: reliability assessment in healthy individuals

Statistical comparison of contact forces and moments in the knee joint during walking in participants with and without valgus malalignment
J. Holder, S. van Drongelen, A. Meurer, F. Stief (Germany)

Preoperative gait compensation patterns in unilateral hip osteoarthritis patients: do they persist one year postoperatively?
S. Van Drongelen, B. Stetter, A. Meurer, H. Bohm (Germany)

Effects of smartphone use during walking on kinetic gait parameters: Preliminary results of a crossover study on an instrumented treadmill
S. Durstberger, W. Klaus, P. Putz (Austria)

The contribution of passive moments to inter-segmental moments during gait: a systematic review
A. Koussou, R. Dumas, E. Desailly (France)

Week-long protocol to monitor physical activity intensity and impact loading in children
D. Catelli, S. Carsen, M. Lamontagne (Canada)

Cable pull – an alternative method for the isometric maximum force measurement
F. Huber, U. Rembor, D. Heinrich, A. Kraft, K. Kuhn, A. Hogan, U. Trinler (Germany)
Can the least dynamic length variation criterion be used to improve the pistoning estimation of persons with a transfemoral amputation?  
J. Leboucher, F. Salami, D. Heitzmann, S. Scharr, M. Alimusaj, S. Wolf (Germany)

A novel method for measuring AFO stiffness using motion capture  
T. Niiler, S. Hackett (USA)

Statistical Parametric Mapping in table tennis topspin backhand shot – inter-individual differences in angular movement  
Z. Bańkosz, S. Winiarski (Poland)

Reliability and accuracy of an on field methodology for ACL risk of injury screening  
A. Ciniglio, M. Donadello, F. Spolaor, A. Guiotto, D. Pavan, F. Cibin, Z. Sawacha (Italy)

On the field biomechanical analysis of side-stepping and landing mechanisms in rugby players.  
D. Pavan, A. Ciniglio, F. Cibin, G. Fantin, B. Meneghin, A. Cazzolato, Z. Sawacha (Italy)

Using a decision tree learning algorithm to classify injury status in adolescent males following return-to-activity criteria  
C. Warren, C. Girard, N.J. Romanchuk, M.J. Del Bel, S. Carsen, D.L. Benoit (Canada)

Development of a methodology for the biomechanical assessment of subjects with lateral epicondylitis.  
C. Herrera-Ligero, E. Medina-Ripoll, S. Pitarach-Corresa, Ú. Martínez-Iranzo, J. López-Pascual, M.J. Vivas-Broseta, I. Bermejo-Bosch (Spain)

Postural effects of chair height when playing the cello  
C. Rousseau, P. Garden, G. Barton, V. Baltzopoulos (United Kingdom)
**Paediatric Disorders**

**Poster Session: Paediatric Disorders Posters**

**17:00 - 18:15**

<table>
<thead>
<tr>
<th>Poster Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>P146 - P146</td>
<td>Coordination and motor control</td>
<td>E. Cinar, I. Gagnon (Canada)</td>
</tr>
<tr>
<td>P147 - P147</td>
<td>Foot and ankle</td>
<td></td>
</tr>
<tr>
<td>P148 - P148</td>
<td>Normative studies</td>
<td></td>
</tr>
<tr>
<td>P149 - P174</td>
<td>Paediatric neurological disorders</td>
<td></td>
</tr>
<tr>
<td>P175 - P176</td>
<td>Prosthetics and orthotics</td>
<td></td>
</tr>
<tr>
<td>P177 - P179</td>
<td>Upper extremity and trunk</td>
<td></td>
</tr>
<tr>
<td>P146</td>
<td>Do children with cerebral dysfunction walk differently than healthy children under dual task conditions? : A meta-analysis</td>
<td>E. Cinar, I. Gagnon (Canada)</td>
</tr>
<tr>
<td>P147</td>
<td>Kinetics and kinematic differences in idiopathic toe walking children</td>
<td>M. Shiraishi, C. Hoang, M. Grant-Beuttler, R. Beuttler, A. Aminian, R. Soangra (USA)</td>
</tr>
<tr>
<td>P148</td>
<td>Comparison of lower-limb load impacts in active and less active children during a week-long protocol</td>
<td>D. Catelli, D. Stone, S. Carsen, M. Lamontagne (Canada)</td>
</tr>
<tr>
<td>P149</td>
<td>Hip kinetics, kinematics, and motor control differences between normal and leg length discrepancy (LLD) children during gait: simulation and experimental</td>
<td>H. Barnamehei, A. Bana Derakhshan, A. Zomorrodi, M. Mohammad Ali, N. Golfeshan, N. Naghavi, M.R. Kharazi (USA)</td>
</tr>
<tr>
<td>P150</td>
<td>Gait improvement with decreased tibialis anterior recruitment after botulinum toxin injections into peroneus longus in children with hemiparetic cerebral palsy</td>
<td>C. Boulay, S. Pesenti, G. Authier, A. Merlo, M. Sangeux, B. Chabrol, J.L. Jouve, J.M. Gracies (France)</td>
</tr>
<tr>
<td>P152</td>
<td>Prevalence of overweight and obesity in Irish ambulant children with cerebral palsy presenting for gait analysis.</td>
<td>K. Brady, D. Kiernan, C. Nikolopoulos (Ireland)</td>
</tr>
<tr>
<td>P153</td>
<td>Biofeedback-driven gaming to improve EMG patterns during gait in children with cerebral palsy</td>
<td>E. Flux, O.A. Atteveld, L. Bar-On, A.I. Buizer, J. Harlaar, M.M. van der Krogt (Netherlands)</td>
</tr>
<tr>
<td>P154</td>
<td>Sensitivity of Conventional Gait Model to lower limb marker misplacement</td>
<td>M. Fonseca, M. Bergere, F. Leboeuf, R. Dumas, S. Armand (Switzerland)</td>
</tr>
</tbody>
</table>
Clinically applicable assessment of passive stiffness and stretch reflex responses using a portable device in children with cerebral palsy.

Effects of cognitive and motor dual-task on spatiotemporal gait parameters in children and adolescents with Cerebral Palsy
P. Haakana, J. Nurminen, J.P. Kulmala, T. Niemelä, E. Marttinen Rossi, H. Maenpää, H. Piitulainen (Finland)

Strength changes after six and twelve weeks of resistance training in children with spastic cerebral palsy

Limits of stability in children diagnosed with Idiopathic Toe Walking
C. Hoang, M. Shiraishi, R. Beuttler, M. Grant-Beuttler, A. Aminian, R. Soangra (USA)

Relationship between gait and perceived mobility in patients with Arthrogryposis Multiplex Congenita – can we optimize orthoses?
M. Hoesl, F. Zollner, F. Afifi, S. Brosseder, M. Kröner, S. Nader (Germany)

Effects of treatment with reciprocal inhibition on gait function in children with cerebral palsy.
M. Kofoed-Hansen, J. Bencke, M. Speedtsberg, T. Torabi, J. Michelsen, C. Wong (Denmark)

Effect of robotic rehabilitation on parameters of frequency analysis of EMG signal in children with cerebral palsy
P. Kutilek, S. Viteckova, Z. Dragana, M. Sorfova, J. Hejda, P. Volf, I. Cikajlo, K. Groleger-Srsen (Czech Republic)

Effect of robotic rehabilitation on symmetry of lower limb movement of children with cerebral palsy
P. Kutilek, S. Viteckova, D. Zarkovic, M. Sorfova, P. Volf, J. Hejda, I. Cikajlo, K. Groleger-Srsen (Czech Republic)

Sagittal plane gait kinematics in children with CP in barefoot, shod and AFO-footwear conditions.
L. Lecount, E. Pratt, A. Scarfe, L. Milner, S. Hewitt, W. Dickens (United Kingdom)

Knee joint position sense in children with motor disorders
C. Lidbeck, M. Eriksson, A. Ericson, M. Reimeringer, Å. Bartonek (Sweden)

Prevalence of triceps suralis lengthening among crouch gait in cerebral palsy
L. Machado Neto, C. Santini, G. Auler Brodt, E. Pflug Comparsi (Brazil)

The relation between clinical tests and gait data in hip flexion contracture due to cerebral palsy.
L. Machado Neto, C. Santini, G. Auler Brodt, E. Plug Comparsi (Brazil)

Crouch gait or flexed-knee gait in cerebral palsy – Is there a difference? A systematic review
A. Marron, K. Brady, R. O'Sullivan (Ireland)

Outcomes of intensive versus minimal spasticity management strategies on individuals with cerebral palsy: preliminary results of a
long-term multi-center study
M. Munger, B.P.J. Chen, E. Duffy, T. Novacheck, B. MacWilliams, L. Carter, M. McMulkin, S. Mader, B. Hayes, M. Schwartz (USA)

P169 Perceived limitations of walking in individuals with cerebral palsy
J. Nelson, E. Boyer (USA)

P170 Morphological alterations between spasticity subtypes in lower limb muscles of children with spastic cerebral palsy

P171 Cluster analysis of electromyographic data in children with Fragile X Syndrome and controls

P172 A pre- and postoperative evaluation of femoral derotation osteotomy on coronal plane kinematics and kinetics of children with cerebral palsy.
A. Royle, E. Pratt, L. Milner, L. Lecount, W. Dickens (United Kingdom)

P173 Alterations in surface EMG during gait in children with Fragile X Syndrome
Z. Sawacha, F. Spolaor, W. Piatkowska, F. Cibin, D. Pavan, A. Guiotto, R. Polli, M. Ricca, A. Murgia (Italy)

P174 The Gait Outcomes Assessment List (GOAL) Questionnaire: Replication of validation in a Gait Analysis Center
J. Stout, K. Walt, A. Georgiadis (USA)

P175 Who benefits most from Posterior Leaf Spring AFOs? - An analysis of children with acquired and congenital central neurological deficits
M. Hoesl, F. Affifi, S. Nader, S. Berweck (Germany)

P176 Comparison of dorsiflexion motion allowed by solid and flexible ankle-foot orthoses during gait for children with cerebral palsy and equinus
K. Kane, K. Musselman, J. Lanovaz (Canada)

P177 The relationship between trunk and lower limb biomechanics during gait in children with cerebral palsy.
D. Kiernan, C.K. Simms (Ireland)

P178 Three-dimensional upper limb movement characteristics in children and youth with dyskinetic cerebral palsy
I. Vanmechelen, S. Bektishi, M. Konings, H. Feys, K. Desloovere, J.M. Aerts, E. Monbaliu (Belgium)

P179 Upper limb movement characteristics of children and youth with dyskinetic cerebral palsy – a sensor approach
I. Vanmechelen, S. Bektishi, M. Konings, H. Feys, K. Desloovere, J.M. Aerts, E. Monbaliu (Belgium)
### Poster Session: Adult/Ageing Posters

**17:00 - 18:15**

<table>
<thead>
<tr>
<th>Poster Numbers</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>P180 - P186</td>
<td>Adult neurological disorders</td>
</tr>
<tr>
<td>P187 - P187</td>
<td>Elderly</td>
</tr>
<tr>
<td>P188 - P189</td>
<td>Foot and ankle</td>
</tr>
<tr>
<td>P190 - P190</td>
<td>Movement analysis</td>
</tr>
<tr>
<td>P191 - P191</td>
<td>Musculoskeletal disorders</td>
</tr>
<tr>
<td>P192 - P196</td>
<td>Prosthetics and orthotics</td>
</tr>
<tr>
<td>P197 - P197</td>
<td>Robotics and assistive devices</td>
</tr>
<tr>
<td>P198 - P199</td>
<td>Sports and sports injury</td>
</tr>
<tr>
<td>P200 - P202</td>
<td>Stability and fall risk</td>
</tr>
</tbody>
</table>

**Abstracts:**

- **P180**
  - **Investigation of effect of different virtual reality environments on saccadic eye movement; construct validity testing in healthy older adults**
  - Y. Imaoka, A. Flury, E.D. de Bruin (Switzerland)

- **P181**
  - **Long term outcomes of ambulatory function in adults with cerebral palsy: evaluating change from adolescence**
  - N. Lennon, C. Church, M.W. Shrader, W. Robinson, J. Salazar-Torres, J. Henley, T. Niiler, F. Miller (USA)

- **P182**
  - **Muscle activation and deactivation dynamics in Parkinson's Disease patients**
  - M. Romanato, F. Spolaor, W. Piatkowska, D. Volpe, Z. Sawacha (Italy)

- **P183**
  - **Changes in muscular and postural control after proprioceptive focal stimulation with Equistasi® device in middle-moderate Parkinson's disease**
  - F. Spolaor, M. Romanato, A. Guiotto, A. Peppe, D. Volpe, Z. Sawacha (Italy)

- **P184**
  - **Evaluation of spatiotemporal characteristics of the six-minute walking test using inertial measurement units among individuals with lower limb amputation**
  - H. Younesian, T. Thomas, L. Miramand, S. Beausoleil, K. Turcot (Canada)

- **P185**
  - **A home-based exercise and activity modification program in patients with acetabular retroversion and excessive anterior pelvic tilt**
  - A.F. Brekke, S. Overgaard, B. Mussmann, E. Poulsen, A. Holsgaard-Larsen (Denmark)

- **P186**
  - **Dual-task effect on gait in adolescents: How does it change in different health profile?**

- **P187**
  - **Gait parameters during the Timed Up-and-Go dual-task test: A validation study of video-recorded data.**
  - A.C. Åberg, H.B. Åhman, F. Olsson, O. Tarassova, Y. Cedervall, T. Arndt, V. Giedraitis, K. Halvorsen (Sweden)
Effects of 12 different heel rocker designs, configurated with different rocker radii, apex positions and apex angles, on plantar pressure
A. Malki, J.M. Hijmans, L. van Kouwenhove, R. Dekker, G.J. Verkerke (Netherlands)

How are midfoot (i.e. Chopart and Lisfranc joint) kinematics altered in adolescents with CP with plano-valgus feet, compared to healthy subjects?
M. Piening, W. Schallig, M.M. Witbreuk, A.I. Buizer, M.M. van der Krogt (Netherlands)

Gait analysis using stride interval of left and right foot in single time series under normal and neurodegenerative diseased conditions
A.O. Abbasi, W. Nahm, M. Manshad (Germany)

The impact of training in virtual reality on balance in patients after total knee replacement is relatively slight
A. Hadamus, D. Białoszewski, E. Urbaniak, A.J. Kowalska, K. Wydra, R. Boratyński, A. Kobza, W. Marczyński (Poland)

Effect of design of assisting devices on the lower body muscular activities during gait with crutch executed by amputees

Energy cost of walking in people after lower limb amputation: a systematic review and meta-analysis
S. Ettema, E. Kal, H. Houdijk (Netherlands)

A flexible prosthetic foot influences the choice of gait-strategy, for persons with a transtibial amputation, while walking up a ramp
D. Heitzmann, J. Block, S.I. Wolf, M. Alimusaj (Germany)

Effects on prosthetic foot ankle power on transfemoral amputee gait
E. Proebsting, B. Altenburg, M. Bellmann, T. Schmalz, K. Krug (Germany)

Characteristics of sound side knee loading parameters of 53 trans-tibial amputees
E. Proebsting, M. Bellmann, T. Schmalz, A. Hahn (Germany)

Unilateral non-electric assistive walking device helps neurological patients to improve gait patterns
B. Feodoroff, V. Blümer (Germany)

Post-rehabilitation knee proprioception after anterior cruciate ligament reconstruction. Joint position sense in relation to performance of an obstacle clearance task
A. Grinberg, A. Strong, C. Häger (Sweden)

Dynamics of femur muscle recovery after ACL reconstruction with various tendon grafts.
T. Serebryak (Russian Federation)

Swing limb biomechanics and minimum toe clearance in rheumatoid arthritis post-menopausal women fallers and non-fallers
M. Bhudarally, P. Aleixo, T. Atalaia, J. Abrantes (Portugal)
P201 Controlling the ground reaction force angle characterises better recovery following a single forward falling slip in young and older adults.
H. Debelle, C. Maganaris, T. O’Brien (United Kingdom)

P202 Assessment of functional mobility in blind individuals: a case study

Closing

18:15 - 18:30