Asian Prosthetic and Orthotic Scientific Meeting 2018
in conjunction with
4th ASEAN Seminar on Multidisciplinary Care for Children with Mobility Impairment

“Prosthetics and Orthotics Empowering ASIA”

7 - 9 November 2018
Narai Hotel, Bangkok, Thailand
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Welcome Message

It is my great pleasure and my deepest honor to welcome all of you to the Asian Prosthetic and Orthotic Scientific Meeting 2018 in conjunction with the 4th ASEAN Seminar on Multidisciplinary Care for Children with Mobility Impairment.

Prosthetics and orthotics is positioned to make a marketed impact the lives of persons with movement impairments. The large number of participants who have gathered here today is a good indication of this. It is my hope that all of us will continue to communicate with each other, work with each other, and challenge each other for the empowerment of the people we are vested in caring for.

By the theme of “Prosthetics and Orthotics Empowering Asia”, I believe that this meeting will not only empower Asia but significantly also awaken the entire world the awareness and concern about the persons with disability, besides that, I sincerely hope this meeting will help promoting the better quality of life of People with Movement Impairment in the future.

I would like to take this opportunity to express my deep appreciation to all speakers, exhibitors as well as all incredible staff for your contributions and dedications to lead the meeting to become success. I hope all the attendees today shall gain some new knowledge and reach the valuable insight by the brand-new technology and the various lectures given.

May God blesses you all.

Nisarat Opartkiattikul MD, PhD
Director of Sirindhorn School of Prosthetics and Orthotics,
Faculty of Medicine Siriraj Hospital, Mahidol University
President of ISPO Thailand
Chair, Organizing Committee APOSM 2018
Welcome Message

APOS M 2018 is your opportunity to connect and share knowledge with prosthetic and orthotic professionals from the Asia Pacific region and beyond. Take the chance!

The only way to move a field forward is through collaboration and multidisciplinary teamwork. Here we have come together 300 people from more than 20 countries representing Governments, Decision makers, Patients/Users, Education centres, P/O Suppliers, Global organisations like WHO, ISPO, ICRS, IC2A, Zv movement foundation. Collaboration and a joint direction can work in concert to orchestrate adequate provision of Prosthetics and Orthotics in the region.

Emerging and on-going issues in education, technical, research, attitudes and sport for our field will set the stage for discussions and development of partnerships amongst all of us here. Responding to these issues with innovative solutions and partnerships is critical for the well-being of our primary beneficiary, the patient and the profession as a whole.

Let us set sail and sail in the same direction and in the same boat towards a future where Prosthetics and Orthotics Empower Asia and where we leave no one behind. Let us convince and prove to everyone that P/O is an investment not a cost.

We extend a warm welcome to all and appreciate your attendance for APOS M 2018 Bangkok, Thailand

Mr. Bengt Soderberg
Director of Center of Excellence Prosthetics and Orthotics (CEPO)
Past President of ISPO
Chair, Scientific Committee APOS M 2018
APOS M 2018 : Background

The Asian Prosthetic and Orthotic Scientific Meeting 2018 has become the most authoritative scientific meeting in the field of prosthetics and orthotics in the Asia-Pacific region. The meeting has been held every two years since 2002 with gracious support from the International Society for Prosthetics and Orthotics.

Following the great success of our previous meetings, the 7th APOS M is set to be held in Bangkok, Thailand and hosted by ISPO Thailand and the Sirindhorn School of Prosthetics and Orthotics, Faculty of Medicine Siriraj Hospital, Mahidol University. This year’s APOS M will be held in conjunction with the 4th ASEAN Seminar on Multidisciplinary Care for Children with Mobility Impairment (4th AMCM) which is co-organized and supported by the Zy Movement Foundation and Thailand Convention and Exhibition Bureau (TCEB).

The theme of APOS M 2018 is “Prosthetics and Orthotics Empowering ASIA”. The rapid growth and achievements of our field throughout Asia is noteworthy. This meeting will serve as an exemplary forum to recognize these achievements and chart a forward direction for our field.

APOS M 2018 will be attended by at least 280 distinguished participants from over 20 countries such as Australia, Bangladesh, Belgium, Cambodia, Canada, China, Germany, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, South Korea, Thailand, United Kingdom, United States and more.

The Asian Prosthetic and Orthotic Scientific Meeting will continue to be the forum for translation of knowledge, innovation, technology, recent research, through gathering of prosthetics and orthotics professionals from around the globe.
## Program Summary

<table>
<thead>
<tr>
<th>Date</th>
<th>Ballroom (Conference Hall)</th>
<th>Laksami Room (Workshop)</th>
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<tbody>
<tr>
<td><strong>NOV-07</strong></td>
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<tr>
<td>09.00 - 10.15</td>
<td>Special Lecture &amp; Opening Ceremony</td>
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<td>10.15 - 11.00</td>
<td>Meet the press &amp; Coffee break</td>
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<td>11.00 - 12.10</td>
<td>Special Lecture &amp; Free Paper</td>
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<td>12.10 - 13.10</td>
<td>Lunch</td>
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<td>13.10 - 14.20</td>
<td>Special Lecture &amp; Free Papers</td>
<td>Free Papers</td>
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<td>Coffee Break &amp; Exhibition</td>
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<td>15.00 - 16.00</td>
<td>Special Lecture &amp; Free Papers</td>
<td>Workshop 1</td>
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<td>18.00 - 21.00</td>
<td>Dinner Cruise (Ticket only)</td>
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<td><strong>NOV-08</strong></td>
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<td>09.00 - 09.50</td>
<td>Special Lecture</td>
<td>Workshop II</td>
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<td>09.50 - 10.50</td>
<td>Coffee Break &amp; Exhibition</td>
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<td>10.50 - 11.10</td>
<td>Special Lecture</td>
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<tr>
<td>11.10 - 12.00</td>
<td>Free Papers</td>
<td>Workshop III</td>
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<tr>
<td>12.00 - 13.10</td>
<td>Lunch</td>
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<td>13.10 - 14.00</td>
<td>Special Lecture</td>
<td>Workshop IV</td>
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<td>13.50 - 14.20</td>
<td>Poster Round</td>
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<td>14.20 - 15.00</td>
<td>Coffee Break &amp; Exhibition</td>
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<tr>
<td>15.00 - 16.00</td>
<td>Special Lectures &amp; AUN HPN PO Group Presentations</td>
<td>Free Papers</td>
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<tr>
<td>16.30 - 17.30</td>
<td>Business Meeting</td>
<td>AUN HPN Group</td>
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<td>17.30 - 18.30</td>
<td>Business Meeting APOSM</td>
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<td><strong>NOV-09</strong></td>
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<td>09.00 - 10.00</td>
<td>Special Lectures</td>
<td>Parent Seminar by Zy Movement Foundation</td>
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<td>10.00 - 10.30</td>
<td>Coffee Break &amp; Exhibition</td>
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<td>10.30 - 12.00</td>
<td>Special Lectures &amp; Free Papers</td>
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<td>13.30 - 14.40</td>
<td>Special Lecture</td>
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<td>14.40 - 15.00</td>
<td>Closing Ceremony</td>
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### Scientific Program

#### November 6, 2018 (DAY-0)

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<tr>
<th>Time</th>
<th>Program</th>
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<tbody>
<tr>
<td>09.00 - 11.00</td>
<td>*Pre-Meeting: SSPO Tour (1st Round)</td>
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<tr>
<td>13.00 - 15.00</td>
<td>*Pre-Meeting: SSPO Tour (2nd Round)</td>
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<tr>
<td>17.00 - 20.00</td>
<td>Pre-Registration/ Poster and Exhibition Installation</td>
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* Shuttle bus provides from Narai Hotel at 8.00 for the 1st round tour and 12.00 for the 2nd round tour

** Limited seats for participants with reservation only

#### November 7, 2018 (DAY-1)

**Ballroom (Conference Hall)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Program/Topic</th>
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<tbody>
<tr>
<td>08.00 - 09.00</td>
<td>Registration</td>
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<tr>
<td>09.00 - 09.15</td>
<td>Thai Classical Music and Performance</td>
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<td>09.15 - 09.25</td>
<td>Welcome Speech:</td>
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<td></td>
<td>Assoc. Prof. Nisarat Opartkiattikul, Chair of Organization Committee APOSM 2018, Mr. Bengt Soderberg, Chair of Scientific Committee APOSM 2018</td>
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<tr>
<td>09.25 - 10.00</td>
<td>Overall Healthcare and PO Services in Thailand:</td>
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<td>Prof. Dr. Prasit Watanapa (Thailand), President of the Medical Council of Thailand, Dean of Faculty of Medicine Siriraj Hospital, Mahidol University</td>
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<td>09.45 - 10.00</td>
<td>Overview of ISPO Work Globally:</td>
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<td>Assoc. Prof. Friedbert Kohler (Australia), President of ISPO</td>
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<tr>
<td>10.00 - 10.15</td>
<td>Opening Ceremony</td>
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<td>• APOSM 2018 Speech Report by Assoc. Prof. Nisarat Opartkiattikul, Chair of Organization Committee APOSM 2018</td>
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<td>• Opening Speech by Prof. Emeritus Piyasakol Sakolsatayadorn, Minister of Public Health, Thailand</td>
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<td>• Official Opening of Poster &amp; Exhibition</td>
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<td>10.15 - 11.00</td>
<td>Meet the Press and Coffee Break</td>
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<td><strong>Chairperson:</strong> Prof. Rajiv Hanspal (UK)</td>
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<tr>
<td>11.00 - 11.20</td>
<td>Global Impact of WHO Standards for P/O:</td>
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<td>Mr. Bengt Soderberg (Sweden), Former President of ISPO</td>
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</tbody>
</table>
11.20 - 11.40  Paralympic Partner - 30 Years of Experience:
Mr. Desmond Tong (Singapore), Ottobock South East Asia

11.40 - 12.10  *Free Paper Session:
1. Reliability and Validity of a Purpose Design Computational Method in the Estimation of Plane of Maximum Curvature (PMC) for Patients with Adolescent Idiopathic Scoliosis: Hui-Dong Wu (South Korea)
2. Use of Real-time Ultrasound Imaging and Curve Flexibility Information to Assist Brace Casting for AIS: Edmond Lou (Canada)
3. The Combined Effect of Orthotic Intervention and Scoliosis Specific Exercise to the Patients with Adolescent Idiopathic Scoliosis: Chengfei Gao (Hong Kong)

12.10 - 13.10  Lunch Break

Chairperson: Ms. Laura Burgess (UK)

13.10 - 13.50  Normal and Pathological Gait and their Relationship to Orthotic Intervention:
Mr. Terry Supan (USA), President and CEO of Supan Prosthetic and Orthotic Consultations

13.50 - 14.20  *Free Paper Session:
1. Wearable Hip-Assist Robot Reduces Muscle Fatigue and Metabolic Energy Consumption in Elderly Persons: Hwang-Jae Lee (South Korea)
2. Vertical Loading Rates in Sports-Active Transfemoral Amputees during Jump-Landing on Intact Leg: Masanori Morikawa (Japan)

14.20 - 15.00  Coffee Break & Exhibition

Chairperson: Dr. Gary Guerra (USA)

15.00 - 15.20  Success and Failures - the Outcome of Collaboration between SSPO and Various Engineering Universities:
Ms. Thanyaporn Rakbangboon (Thailand), Sirindhorn School of Prosthetics and Orthotics, Assoc. Prof. Nantakrit Yodpijit (Thailand), King Mongkut's University of Technology North Bangkok, and Asst. Prof. Pairat Tangpornprasert (Thailand), Chulalongkorn University
15.20 - 16.00  
*Free Paper Session:
1. Analysis of the Economic Value of Walking Provided by Prosthetic Rehabilitation: David Boone (United States)
2. Smart Insole with Instant Vibrotactile Biofeedback of Plantar Force Improve Gait of Patients with Stroke: Christina Zong-Hao Ma (China)

18.00 - 21.00  
**Dinner Cruise (Ticket Only)

*Remark: Free paper is about 8 to maximum 9 minute presentations (3 minute discussions/switching)
**Remark: Dinner Cruise is reserved for participants with tickets only Shuttle bus for Dinner Cruise will leave from Narai Hotel at 18.00

November 7, 2018 (DAY-1)
Laksmi Room (Workshop Room)

<table>
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<tr>
<th>Time</th>
<th>Program/Topic</th>
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<tr>
<td>13.10 - 14.20</td>
<td>Free Paper Session:</td>
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<tr>
<td>1. Diffusion of NU-FlexSIV Socket in Japan 2017-2018: Shin Sasaki (Japan)</td>
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<td>2. Comparison of Strength and Characteristics of AFO Manufactured by 3D Printer and Existing Method: Hironori Suda (Japan)</td>
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<td>3. The Importance of a User-Centred Approach and Scoping Work When Exploring the Potential Benefit of Computer-Based Technology within P&amp;O Services in LMICS: Maggie Donovan Hall (United Kingdom)</td>
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<td>4. Development of a Shoes-Type Road Surface Identification Device Aiming for Fall Prevention: Satoshi Izumiya (Japan)</td>
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<td>5. Risk and Hazard Identification in the Prosthetic and Orthotic Clinic and Workshop Areas of UERMMMCI-PSPO: Julio Esteban Tiu (Philippines)</td>
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| 14.20 - 15.00 | Coffee Break & Exhibition |
| 15.00 - 16.00 | Workshop Ossur I: Prosthetics Solutions: Paso Knee by Louis Daniel Biermann |

18.00 - 21.00  
**Dinner Cruise (Ticket Only)

*Remark: Free paper is about 8 to maximum 9 minute presentations (3 minute discussions/switching)
**Remark: Dinner Cruise is reserved for participants with tickets only Shuttle bus for Dinner Cruise will leave from Narai Hotel at 18.00
November 8, 2018 (DAY-2)
Ballroom (Conference Hall)

<table>
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<tr>
<th>Time</th>
<th>Program/Topic</th>
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<tr>
<td>08.30 - 09.00</td>
<td>Registration</td>
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<tr>
<td>09.00 - 09.20</td>
<td>Complex Prosthetic Rehabilitation: Hip Disarticulation and Hemipelvectomy:</td>
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<td></td>
<td>Assoc. Prof. Karen Andrews (USA), Department of Physical Medicine and</td>
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<td>Rehabilitation, Mayo Clinic, Rochester, Minnesota</td>
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<td>09.20 - 09.40</td>
<td>Amputee Association Uniting the World: Dr. Nils-Odd Tønnevold (Norway),</td>
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<td>President of IC2A</td>
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<td>09.40 - 09.50</td>
<td>Introduce to SEA Magazine: Dr. Gary Guerra (USA), Sirindhorn School of</td>
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<td>Prosthetics and Orthotics</td>
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<td>09.50 - 10.50</td>
<td>Coffee Break &amp; Exhibition</td>
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<td>10.50 - 11.10</td>
<td>Management of Congenital Fibular Hemimelia: Prof. Rajiv Hanspal (UK),</td>
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<td>Consultant in Rehabilitation Medicine, RNOH Stanmore and Immediate Past</td>
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<td>President of ISPO</td>
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<td>11.10 - 12.00</td>
<td><em>Free Paper Session:</em></td>
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<tr>
<td></td>
<td>1. What is the Difference between Angulation and Translation Alignment</td>
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<td>Changes in Transtibial Protheses: Hiroshi Hashimoto (Japan)</td>
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<td>2. Development of a Frugal (low cost) Innovation Pipeline to Address</td>
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<td>Prosthetics and Orthotics Issues in Low-to-middle Income Countries: Chris</td>
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<td>Natt (United Kingdom)</td>
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<td></td>
<td>3. Prosthesis for Through Knee Amputees in Low to Middle Income Countries:</td>
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<td>Grigorios Grigoriadis (United Kingdom)</td>
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<td>4. Passive Mechanism for Transfemoral Prosthetic Knee to Ascend and Descend</td>
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<td>Stairs: Takahisa Yamamoto (Japan)</td>
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<td>12.00 - 13.00</td>
<td>Lunch Break</td>
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<td>13.00 - 13.20</td>
<td>Ultrasound-Guided Assessment and Orthotic Treatment of Adolescent Idiopathic</td>
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<td>Scoliosis:</td>
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**Assoc. Prof. Man-Sang Won (Hong Kong),** Head of Biomedical Engineering, The Hong Kong Polytechnic University

13.20 - 13.40 Intelligent Orthotic Knee Joint:  
**Prof. Edward Lemaire (Canada),** University of Ottawa, Ottawa Hospital Research Institute

13.40 - 14.20 **Poster Round**  
Chairpersons: **Dr. Gary Guerra** and **Dr. Kazuhiko Sasaki**

14.20 - 15.00 **Coffee Break & Exhibition**

**Chairperson: Prof. Eiji Tazawa (Japan)**

15.00 - 15.20 The Future Impact of Education for Standards of P/O:  
**Mr. Carson Harte (UK),** Chief Executive of Exceed Worldwide

15.20 - 16.00 Presentations from AUN HPN PO Group Representatives:  
1. An Overview of the Philippine School of Prosthetics and Orthotics: The First in the Philippines - **Alyssa Joyce D. Gorgonio** (Philippines)
2. Development of Prosthetic and Orthotic Education in Myanmar - **Chanpov Check** (Myanmar)
3. Kobe College of Medical Welfare, Sanda Campus’s Education System - **Shin Sasaki** (Japan)

*Remark: Free paper is about 8 to maximum 9 minute presentations (3 minute discussions/switching)*

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**November 8, 2018 (DAY-2)**

**Laksmi Room (Workshop Room)**

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<th>Time</th>
<th>Program/Topic</th>
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<tr>
<td>09.00 - 09.50</td>
<td><strong>Workshop Ossur II</strong> : OA &amp; Injury Solutions: Unloader Bracing by <strong>Christopher Wallis</strong></td>
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<tr>
<td>09.50 - 10.50</td>
<td><strong>Coffee Break &amp; Exhibition</strong></td>
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<tr>
<td>11.10 - 12.00</td>
<td>Workshop Becker Orthopedic: Perspectives on Stiffness, Alignment and Outcomes Assessment for AFOs Treating Gait Disfunction in Individuals with Neuromotor Impairment by <strong>Nicholas LeCursi</strong></td>
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<tr>
<td>12.00 - 13.00</td>
<td><strong>Lunch Break</strong></td>
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13.10 - 14.00 Workshop WillowWood and Massons Healthcare: The Latest in Prosthetic Liner Technology by **Bill Marmaris**

14.00 - 14.20 **Poster Round**
Chairpersons: **Dr. Gary Guerra** and **Dr. Kazuhiko Sasaki**

14.20 - 15.00 Coffee Break & Exhibition

**Chairperson: Dr. Kazuhiko Sasaki (Japan)**

15.00 - 16.00 *Free Paper Session:*

1. A Comparative Repeatability Assessment of Manual Casting and Scanning of Residual Limb: **Sisary Kheng (Cambodia)**
2. Video Analysis of Falling during Wheelchair Rugby Tournament: **Junpei Sasadai (Japan)**
3. Finite Element Analysis of Stump Changes Under Prosthesis Socket the Modeling by MRI Images: **Takahiro Ono (Japan)**

16.30 - 17.30 Business Meeting for AUN-HPN PO Group (Invited)
17.30 - 18.30 Business Meeting for APOSM Board Committee (Invited)

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**November 9, 2018 (DAY-3)**

**Ballroom (Conference Hall)**

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<th>Time</th>
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<tr>
<td>08.30 - 09.00</td>
<td>Registration</td>
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**Chairperson: Assoc. Prof. Karen Andrews (USA)**

09.00 - 09.20 Severe Hind Foot Deformities and the Operative Reconstruction: **Prof. Frank Braatz (Germany)**, University Medical Center Göttingen

09.20 - 09.40 Application of Biomechanics in P/O: **Prof. Jim Richards (UK)**, University of Central Lancashire, Preston, UK

09.40 - 10.00 Japanese Contribution to P/O in South East Asia: **Prof. Eiji Tazawa (Japan)**, Tazawa MFG, Prosthetics and Orthotics Patients Care Service

10.00 - 10.30 Coffee Break & Exhibition
**Chairperson: Prof. Edward Lemaire (Canada)**

10.30 - 10.50  Improving Efficiency in P/O Centre to Increase the Impact :

*Mr. Claude Tardiff (Canada)*, Rehabilitation and Mobility Devices Consultant

10.50 - 11.10  Roles and Responsibilities of P&O Professional Body :

*Prof. Kazuhiro Sakai (Japan)*, University of Human Arts and Sciences, President of Japanese Academy of Prosthetists and Orthotists

11.10 - 12.00  *Free Paper Session*

1. Assessing and Benchmarking Low Cost 3D Scanners for Transtibial Prosthetic Socket Design : *Alexander Dickinson (United Kingdom)*

2. Finite Element Evaluation of Compression/Release Stabilized Transfemoral Socket Effect on Residual Limb : *Zhaojian Meng (China)*

3. Students’ Perceptions of Prosthetics and Orthotics and Assistive Technology Education in Japan : *Akouetevi Aduayom-Ahego (Japan)*

4. Designing a Distributed Prosthetics Database for Use in Lower- and Middle Income Countries : *Stefanie Wiegand (UK)*

12.00 - 13.30  Lunch and Last Chance for Exhibition

**Chairperson: Mr. Bengt Soderberg (Sweden)**

13.30 - 14.00  *Free Paper Session :*

1. 3D Printed Victoria Hand : Survey of User Satisfaction of the Transradial Amputees in Nepal : *Amit Ratna (Nepal)*

2. 3D Printing: Technical Overview, Possibilities in Orthotic and Prosthetic Care Future Trends : *Caroline Scherer (Germany)*


14.00 - 14.20  Gait Reeducation and Gait Faults :

*Ms. Laura Burgess (UK)*, Clinic Specialist Physiotherapist of Imperial College Health Care NHS Trust
14.20 - 14.40  Ischial-Ramus Containment in Transfemoral Socket Designs:  
**Mr. Marlo Ortiz (Mexico)**, Ortiz International Guadalajara, Mexico

14.40 - 15.00  **Closing Ceremony & Farewell**
- Closing Speech by Chairs of APOSM 2018
- Announcement of ISPO Congress 2019 and APOSM 2020

*Remark: Free paper is about 8 to maximum 9 minute presentations (3 minute discussions/switching)*

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November 9, 2018 (DAY-3)  
Laksmi Room (Workshop Room)

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<th>Time</th>
<th>Program/Topic</th>
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<tr>
<td>09.00 - 12.00</td>
<td>Workshop: <strong>Zy Movement Foundation</strong></td>
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Abstract:
Invited Speakers
Overall Health Care and Prosthetic and Orthotic Services in Thailand

Prasit Watanapa
Dean of Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand

The health care system in Thailand is classified into 3 major schemes. “The Civil Servant Medical Service Scheme” covers approximately 6 million Thai people (just under 10% of the total population). “The Social Security Scheme” involves up to 8 million population (about 12% of the total population), and “The Universal Coverage Scheme” which covers approximately 47 million Thai population (almost 70% of the total population). According to the recent data in 2017, the ratios between healthcare professionals and the Thai population are by large approaching the targeted figures: i.e. physician to population = 1 : 1,292; dentist : population = 1 : 5,643; pharmacist : population = 1 : 2,494; and nurse : population = 1 : 419. However, the number of certified officers for prosthetics and orthotics is far behind the optimum figure. In 2015, 1.24% of the Thai population (856,581 cases) was reported to have physical impairment, theoretically requiring 345,035 certified officers for prosthetics and orthotics. The actually number was in fact only 261. Nevertheless the situation of disability people in Thailand has markedly improved since the implementation of “Persons with Disabilities Empowerment Act 2007”, of which the crucial issue is:

Person with disabilities shall be entitled to access and use public facilities including other welfare and assistance provided by the state as follows:

- Services of rehabilitation by medical processes along with expenses incurred in treatments, equipment, helping devices and development enhancement medias in order to adjust their physical, mental, emotional, social, conduct, intellectual, learning condition, or strengthen their capacity, as prescribed by Minister of Public Health

In order to improve the quality of life of people with disabilities, the combination of strong government policy to support disabling people and the establishment of high quality institution producing high quality officers for prosthetics and orthotics is obviously the critical key success factor.
Overview of the Work of ISPO

Friedbert Kohler
Associate Professor, President ISPO

The aim of this presentation is to give a broad overview ISPO. The presentation will present the mission and vision of ISPO and how this is implemented, a brief description of the current status of the organisation and give a brief overview of the history and structure of ISPO. The major strengths of ISPO are its multidisciplinary nature and the large number of partners which ISPO interacts and works with. One of the most important relationships is the relationship with the WHO. An outline of the various activities that ISPO is involved in and how it may evolve further into the future completes this presentation.
Global Impact of WHO Standards for P/O

Bengt Soderberg

CEPO/Mahidol University Bangkok, Skane University Hospital Sweden, Scandinavian Orthopaedic Laboratory, Past President ISPO

The current state of Prosthetics and Orthotics globally is not very encouraging. WHO says in a world report that we only supply 5-15% of the world need today in P/O.

For Prosthetics it is hopefully better than for Orthotics in terms of global supply but enormous challenges are still there and the variations in Prosthetic Service is as big as there is extreme poverty in the world and extreme wealth for a very small population. 20% of the people use 80% of the global resources and that might be the same for Prosthetics.

We have some factors restricting a more equal P/O service today. Firstly very few people can afford the cost. Secondly we have a shortage of educated staff. Thirdly we are battling with a to slow change in attitude towards disability.

BUT

There is light in the tunnel and we see very strong signs that Prosthetics and Orthotics is moving into a big positive change.

- WHO have started a flagship project under the name GATE (Global cooperation for assistive Health devices) P/O is a major part of this.
- WHO have released Standards for Prosthetics and Orthotics
- WHO have signed a new resolution adopted May 2018 promoting P/O “Improving access to assistive technology”
- WHO have published a document to suggested a list of 50 essential assistive devices which is to expected to be delivered free to people in need in WHO member countries.

This will push the component prices down and make P/O available for more people.

- The attitude towards disability is changing thru very good Prosthetic Ambassadors
- The world is getting richer and people are getting older and healthier
- P/O Schools are getting better and educate higher number of students. Here ISPO have taken the roll to advice on educational standard.
- ISPO, other multi professional and global organisations are reaching out better.
- Prosthetics and Orthotics attract more donors
- The reimbursement systems are getting better even if in some countries it is declining.
- Prosthetics is also seeing a major shift in technology and technique. Osseo integration, intelligent knee joints and other components are contributing to reduce the consequence of a disability for a few people.

This talk is only going to concentrate on one of the above points namely WHO Standards for Prosthetic and Orthotic service, one of the most important document ever published by WHO within the P/O field.
Paralympics Partner - 30 years of experience

Tong Desmond

*Business Development Manager, Ottobock South East Asia*

All around the world, the Ottobock name stands for high-quality and technologically outstanding products and services. The goal of helping to restore mobility for people or protect what mobility they have stands behind each and every Ottobock product. The conviction that quality of life is closely associated with a maximum of individual freedom and independence is a key concept that has been a major influence throughout the company’s 90-year history.

These are the same reasons why Ottobock is the longest serving partner to the Paralympic games for technical service since 1988 in Seoul to the most recent games in Rio in 2016.

In Ottobock, we believe that it is critical that people with disabilities have access to the sense of empowerment and confidence that comes from participation in physical activity.

The athleticism and determination of Paralympic athletes can serve as a great inspiration and deserve the same recognition and support enjoyed by able-bodied athletes.
Normal and Pathological Gait and Their Relationship to Orthotic Intervention

Terry J Supan

President of Supan Prosthetic and Orthotic Consultations

Southern Illinois University School of Medicine

This instructional course consists of a review of normal gait; an overview of pathological conditions and their impact on lower limb function and gait; and a discussion of current design principles for orthotic interventions being used in the United States. Normal and pathological biomechanics will be presented in both the sagittal and coronal planes. Different AFO, KO and KAFO designs will be presented and their impact on gait and other biomechanical function will be discussed.

Perry & Gage described the five major attributes of gait as: Stability in stance; Foot clearance in swing; Appropriate swing phase pre-positioning of foot; Adequate step length; Energy conservation. Irrespective of the underlying diagnosis the pathological conditions of weakness, spasticity, contractures, sensory loss, and pain can all affect the patient’s ability to walk efficiently. Understanding the phases of gait; the biomechanics of joint equilibrium; 1st, 2nd, & 3rd rocker; and R1 & R2 Range of Motion will help the orthotist recognize how these pathologies will affect gait and how their orthotic intervention can help the patient overcome their disabilities.

Different joint designs and orthosis alignments can have a different effect on the attributes of gait. The goal of any orthosis should be to provide enough correction without encumbering the patient’s function.
Success and Failures: The Outcome of Collaboration between SSPO and Various Engineering Universities

Thanyporn Rakbangboon
Sirindhorn School of Prosthetics and Orthotics (SSPO)
Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand

Interprofessional/interdisciplinary research collaboration occurs when researchers from more than one profession/discipline are “working together to achieve a common goal of producing new scientific knowledge. Collaborations between Prosthetists/Orthotists and engineering researchers is essential for addressing clinically-relevant research, solving problems and providing improved quality of life to prosthesis and orthosis users.

We believe that direct collaboration amongst an engineering-based research laboratory and clinical providers of prosthetic and orthotic services can address many of the potential limitations of research developed in an isolated manner. The discoveries could possibly translate to later help practitioners achieve treatment goals. Research experiences in mechanical and electronic engineering combined with clinical environment can augment clinical services and help explore novel approaches to the design, fitting and evaluation of prostheses and orthoses.

Recently, SSPO has collaborated with various engineering universities in Thailand. Not only from the biomedical engineering but also mechanical and electrical engineering faculties. Our aim has been to develop prosthetic and orthotic technologies which will meet the complex needs of people with disabilities, and enhance their quality of life. These projects have included development of prosthetic knees and feet which are affordable but that do not compromise function.

Engineers bring unique skill sets to the research process as do prosthetist orthotists. In tandem, we have discovered challenges and best practices for joint institutional collaborations. A communicatige and collaborative environment is a significant part of the success of a research program.
The talk in this session will be an open panel discussion with engineering and prosthetic and orthotic researchers

- Collaboration research projects
- The factors that influence the success
- Challenges of the interprofessional collaboration
Complex Prosthetic Rehabilitation:

Hip Disarticulation and Hemipelvectomy

Karen L. Andrews
Associate Professor of Physical Medicine and Rehabilitation, Department of Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minnesota

The hemipelvectomy, most commonly performed for pelvic tumor resection, is one of the most technically demanding and invasive surgical procedures performed today. Adequate soft tissue coverage and wound complications after hemipelvectomy are important considerations. Rehabilitation after hemipelvectomy is optimally managed by a multidisciplinary integrated team. Understanding the functional outcomes for this population assists the rehabilitation team to counsel patients, plan goals, and determine discharge needs. The most important rehabilitation goal is the optimal restoration of the patient’s functional independence. Factors such as age, sex, etiology, level of amputation, and general health play important roles in determining prosthetic use. The three main criteria for successful prosthetic rehabilitation of patients with high-level amputation are comfort, function, and cosmesis.

Recent advances in hip and knee joints have contributed to increased function.

Prosthetic use after hemipelvectomy improves balance and decreases the need for a gait aid. Using a prosthesis helps maintain muscle strength and tone, cardiovascular health, and functional mobility. With new advances in prosthetic components, patients are choosing to use their prostheses for primary mobility.
Amputee Association Uniting the World

Nils-Odd Tønnevold

President IC2A, The International Confederation of Amputee Associations

Objective: Contribute to improved quality of life of amputees and individuals born with limb deficiency by sharing experiences, knowledge and best practice among amputee associations and by acting as a single global voice for amputees.

Method: IC2A was founded in 2015 by seven founding member country Amputee Associations and is registered as a non-profit, umbrella organisation and works closely with the World Health Organisation (WHO) and the International Society for Prosthetics and Orthotics (ISPO), government bodies, partner organisations and others with common goals. IC2A was represented on the WHO Standards Development Group which produced the WHO Standards for Prosthetics and Orthotics. IC2A now actively focus its work to support the implementation of the Standards through projects, initiatives, speaking at conferences and awareness campaigns. IC2A actively use social media (Facebook, Twitter and Instagram) to further its aims. We help amputees to form amputee associations Amputee associations in all parts of the world including all parts of Asia are welcome as members. We provide birth help for new associations. Having a national amputee association is very important so users are able to exchange experiences and find inspiration from each other. Experience from Norway, what to do and how to fund it. Ethical guidelines prevent conflict of interest.

Results: The difference we make: We believe that users can contribute to inspire and motivate each other to overcome limb loss and focus their energy on becoming full and active participants in society through work, education and leisure. To follow up this IC2A has a particular focus on implementing Standard 53 «Peer support and counselling should be available to all service users as appropriate» Peer support frees up time used by doctors, nurses, CPOs and other health care professionals to focus on medical and P&O care whereas we fill the need people have to talk to someone in the same situation and answer questions and offer peer support. And we believe users voice is essential to ensure better and more appropriate products and services. We share experiences and endorse best practices in amputee rehabilitation and in
particular focus good prosthetic socket fit as a key element for providers to meet the WHO P&O Standards.

**Conclusion**: IC2A is a powerhouse for amputee user organisations all over the world.
SEA Magazine: “P&O Circular”

Gary Guerra
Sirindhorn School of Prosthetics and Orthotics, Faculty of Medicine,
Siriraj Hospital, Mahidol University

Overview: Creating a communicative and interactive O&P environment in SE Asia was the impetus for the creation of an engaging cloud-based communication platform which could provide a unique atmosphere for clinicians and students. As of now, the platform is being used for international graduate P&O students to do the following:

1. Interact with one another in a routine and engaging manner
2. Provide educators with insight into their graduate research projects
3. Submit clinical and technical cases

The P&O Circular is organized into channels with each channel providing a series of sub-categories for individual user submissions. The circular is currently available to P&O students and to invited peers.
Scoliosis is a 3-dimensional (3-D) spinal deformity usually with lateral curvature of the spine and vertebral rotation. Most cases are with unknown cause and found in adolescence, therefore, it is termed as adolescent idiopathic scoliosis (AIS). For severe cases, surgeries will be considered but for moderate AIS, the conventional treatment method is to apply rigid spinal orthoses to patients during their puberty to mechanically support the spine and prevent further deterioration. The outcome of orthotic treatment for AIS is generally considered being associated with the orthosis design and patient’s compliance.

Although scoliosis is a 3-D spinal deformity, there is lack of non-invasive, inexpensive and accurate assessment method to allow clinicians to reveal the change of deformity during the processes of orthotic design and patient fitting. Moreover, the current orthotic methods and techniques are lack of enough scientific evidence although there are some studies demonstrated the spinal orthosis being effective. The relevant technical information such as “Where are the best locations to put the correcting pads and counteracting pads in the design of spinal orthosis under the three-point pressure system in the three anatomical planes? How tight should the patients wear the orthoses? What should be an ideal strap tension? How long should the patient wear the orthoses? What is the patient’s compliance to orthotic treatment? Whether all these factors are important, necessary and related to the clinical efficacy and outcome?” More clinical researches on these aspects are deserved.

In this seminar, the speaker will share with the delegates his research studies, clinical experiences and scientific evidences to better understand the science behind the phenomenon that orthoses appear effective and go further for evidence-based practice. Moreover, application of the state-of-art ultrasound technique to the assessment of spinal deformity and flexibility, as well as in the design and fitting of spinal orthosis will be discussed and the relevant clinical results will be reported in the scientific meeting.
Biomechanical Evaluation of A Variable Resistance Microprocessor Controlled Orthotic Knee Joint

Edward D Lemaire\textsuperscript{1,2}, Johnny Farah\textsuperscript{1,2}, Ted Radstake\textsuperscript{3}, Chris Duke\textsuperscript{4}, Jawaad Bhatti\textsuperscript{4}

\textsuperscript{1}Ottawa Hospital Research Institute, Canada, \textsuperscript{2}University of Ottawa, Canada, \textsuperscript{3}The Ottawa Hospital, \textsuperscript{4}The Blatchford Group, UK

**Objective**: To provide optimal mobility for people with lower extremity weakness, orthotic joints must evolve by combining machine learning and mechanical designs that adapt to the environment. A novel microprocessor-controlled orthotic knee joint was developed by combining the Ottawalk-Speed mechanical design, a new control system and valve based on the Endolite Elan prosthetic foot, and a new interface manifold. This variable stance control KAFO (VSCKAFO) enables safe mobility in the community by dynamically adjusting knee flexion resistance according to real-time multiple-sensor analysis at the thigh and knee. The VSCKAFO is low profile (i.e., fits beneath clothing) and modular, with all sensors within the knee joint, enabling patient-specific decisions on ankle joints and the foot sections. This research evaluated VSCKAFO biomechanical performance in terms of appropriate mode switching and variable knee flexion resistance.

**Methods**: Five able-bodied participants were recruited for this pilot assessment. Participants were fitted with the VSCKAFO and device settings were adjusted to the participant during an accommodation period. A lower body, 6 degree of freedom marker set was affixed to each participant before self-paced level walking in a CAREN-Extended virtual reality environment. Ten strides of 3D motion analysis data (10 camera Vicon System, 2 force plates) were analyzed.

**Results**: Level walking stride parameters, kinematics, and kinetics were similar to walking without a KAFO. Knee flexion resistance engaged periodically based on the individual’s settings. Following level walking, kinematic data were collected from each participant during stair descent and sitting.

**Conclusion**: The novel VSCKAFO successfully determined gait phases using the integrated sensors, rapidly adjusting knee flexion resistance during movement, and resisting knee flexion during weight-bearing while allowing free knee motion.
during swing. For stair descent and sitting, the knee successfully controlled knee flexion to enable safe decent. More research is needed to further optimize control settings to the individual to enable walking with consistent safe knee release during swing. The successful biomechanical analysis supports further testing of this VSCKAFO with people with knee extensor weakness.
The Future Impact of Education for standards of P/O

Carson Harte  
*Chief Executive of Exceed Worldwide*

After 25 years working with ISPO Guidelines for the Education of Prosthetist Orthotists, as an educator, a project developer and a P&O education initiator, the author will reflect on the successes and failures, and the lessons learned.

Educational development with the advent of the New “standards” in P&O education, will offer potential change and will offer alternative routes to “qualification”. The author will reflect on the new standards, the approach behind the new document and seek to offer examples of how the new standards might be applied in countries where the profession is in a fledgling state or is in a more advanced and secure position.
Foot Deformities - Biomechanical Principles - Cases

Frank Braatz
Professor, University Medical Center Göttingen
PFH Private University of Applied Sciences Göttingen

Objective: Neurological disorders are often causing foot deformities. These deformities influence the ability to walk and the gait pattern. Severe Varus or valgus foot deformities can become debilitating, causing pain and decreasing mobility and the ability to perform daily activities.

Material and Method: 29 Patients with cavovarus-foot deformities were included in the retrospective study.

Result: 85,4 % of the results were good and satisfying, 7 recurrences of the deformities, which made a second operation necessary.

Conclusion: Not only the severe proximal deformities of lower limb, hip dislocation and internal rotation gate, influence the gait, but also severe foot deformities. Ground reaction force influences the foot first and leads easily to severe gait deviations. For good functional results foot deformities has to be considered.
Application of Biomechanics in Prosthetics and Orthotics

Jim Richards
Professor of Biomechanics, Allied Health Research Unit,
University of Central Lancashire, Preston, UK.

Objective: Biomechanics has been the cornerstone of Prosthetics and Orthotic research for nearly 50 years. This work has included the testing and development of different designs and components and the investigation of their effect on patient mobility.

Method: This talk will explore the outcome measure that we can gain from biomechanical assessments and how these are able to help our understanding of current prescriptions used within Orthotics and Prosthetics, and how such information can guide further developments of such devices.

Results: This talk will cover the possibilities and challenges of including incorporating clinical gait analysis into clinical services to aid orthotic and prosthetic prescription based on functional deficits and patient presentation.

Conclusion: This talk will include challenges and solutions to optimise orthotic and prosthetic prescription and future challenges to improving patient mobility during a wider range of activities of daily living.
Japan has been closely related with Asia, particularly within the South East Region in trades and culture.

In regards to Prosthetics and Orthotics fields, it has been quite sometimes since collaboration with South East Asia and Japan.

I would like to share this topic with participants of APOSM 2018, Bangkok in followings and introduce some of the activities in Japan.

1) JICA (Japanese International Cooperation Agency)
2) ISPO Japan
3) HOPE (Humanitarian Orthotics and Prosthetics Endeavour)
4) The Nippon Foundation.

Activities in Japan
1) Public awareness
2) Amputee awareness
3) Support for Child amputees
Improving Service Provision Efficiency to Improve Access to Services

Claude TARDIF
Physical Rehabilitation Advisor, Canada

Objectives: It has been estimated that people needing orthoses or prostheses and related services represent 0.5% and that the number of people with disabilities in developing countries who require a wheelchair constitutes approximately 1% of the population. The number of people seeking access to rehabilitation and mobility device services is projected to increase, which could suggest a corresponding increase in the need for service. In many countries, the number of service providers is not enough to answer the needs and/or to facilitate access to services. While decentralization of services improved access to services, in many countries it may not be possible to extend the network of centres for several reasons including; lack of funding, lack of professional human resources, etc. Therefore, it is important that existing service providers function at their optimal capacities.

Material and Method: Efficiency is normally measured by looking at the relationship between cost and outputs; efficiency could be defined as the ration of the outputs to the associated costs of providing these services. Efficiency is attained when the maximum interventions, to the extent feasible, are optimally correlated to available resources (i.e. infrastructure, financial, human resources, etc.). Cost-effectiveness in service provision can ensure that available funds are used in a responsible way. Cost-effectiveness could be defined by the extent to which an intervention has achieved or is expected to achieve its results at a lower cost, while maintaining or improving the quality, compared with alternatives. However, only looking at the cost of an intervention is not enough. A cost-effectiveness analysis can be used to compare the relative costs, impacts and benefits, for the service provider and for the beneficiaries, of two or more alternatives interventions.

Results: Developing efficient services increases availability, accessibility with equity (i.e. accessible to all, no matter their social status and/or revenues), affordability (both for the service users, the service providers, and for national health and social system) and that a maximum number of people can access
services with the use of available resources (financial, human, materials, components, etc).

**Conclusion:** To increase the number of people having access to appropriate services, it is important that existing service providers function at their optimal capacities whereas they develop efficient and cost-effective services correlated to an increased access of services availability.
The Role and Responsibilities of P&O Professional Body

Kazuhiro Sakai
Professor, Japanese Academy of Prosthetists and Orthotists,
President of Japanese Academy of Prosthetists and Orthotists

Introduction: Central to contemporary rehabilitation philosophy, well-functioning interdisciplinary teams are critical for service integration and successful outcomes (Strasser et al., 2008).

Team competence derives from the ability of multiple disciplines to behave as a single system (Judi Behm, Interdisciplinary Rehabilitation Team). In addition, competency level of each profession is also crucial to enhance the team approach.

“Profession” is defined in several ways, for instance, as follows:

- Professions are non-manual full-time occupations which presuppose a long specialized and tendentiously also scholarly training which imparts specific, generalizable and theoretical professional knowledge, often proven by examination. (Brante, 1990)

- A profession is an occupation which is pursued largely for others and not merely for oneself. (Brandeis, 1933)

We, healthcare professionals, are typical professions who serve for the good society to secure people’s healthier and quality of lives.

However, as Eraut and Cole mentioned (1993), a sense of responsibility for maintaining or strengthening the status and reputation of their profession in its service to the community is a common characteristic of professions, and consequently we need to show outcomes of our work to public.

Prosthetist and/or Orthotist (P&O) profession is unique in that they provide healthcare service through fitting P/O devices.

The role of P&O profession is defined by some related associations/organizations, for instance, as follows:
• The role of the orthotist/prosthetist is to promote quality of life through a client centered approach to the provision of orthotic and prosthetic treatment. (The Australian Orthotic Prosthetic Association)

• Orthotist and/or prosthetist is a health care professional who is specifically educated and trained to manage comprehensive orthotic and/or prosthetic patient care. This includes patient assessment, formulation of a treatment plan, implementation of the treatment plan, follow-up and practice management. (American Board for Certification in Orthotics, Prosthetics and Pedorthics, Inc.)

P&O profession is also unique in some countries, such as the US, Germany and Japan, in that they mostly work at private sectors. In those countries, P&O profession is surrounded in competitive environment, and is sometimes struggle with some problem, such as reimbursement.

What is a Professional body?
A professional body is a group of people in a learned occupation who are entrusted with maintaining control or oversight of the legitimate practice of the occupation. (Baldwin, 2009)

And what a professional body does is:
• To specify the requirements for entry to the professional body, including initial educational or professional qualifications
• To identify requirements for continued membership, including continuing professional membership, work experience, and so on
• To have a set of regulations or code of professional ethics to which members must adhere or risk the sanction of expulsion from the professional body. (Harvey, et. al. 2014)

“Guild” could be taken as “the origin of Professional body”, which is defined as any of various medieval associations, as of merchants or artisans, organized to maintain standards and to protect the interests of its members, and that sometimes constituted a local governing body or an organization of persons with related interests, goals, etc., especially one formed for mutual aid or protection (Zimmermann, 2016), and I believe that this concept also could be applied for P&O professional bodies.

What is the role of P&O professional body?
In my literature searching related to this topic, I found an interesting
question on the role of professional bodies, thus “Are professional bodies a means to safeguard the public interest or do they exist for the benefit of their members?”, and this leads my question thus “How does P&O professional body in each country play its role in the society?” So, I have decided to conduct a small survey by reaching representative of each country’s P&O professional body to ask what they do, and look forward to sharing the result of the survey with participants of the APOSM Bangkok.

Finally, let me introduce the Japanese Academy of Prosthetists and Orthotists (JAPO), which my colleagues and I have led for six years so far, as follows:

JAPO was founded in May, 1993, as a professional body consisted by national licensed prosthetists and orthotists (current number of memberships is 2,300).

The mission of JAPO is to contribute to the welfare of handicapped, and towards medical and healthcare development. In addition, its aim is to fulfill our social responsibility by promoting scientific and educational attainments in the discipline of prosthetics and orthotics.

**Current activities include**:

- Quality monitoring P&O educational program, and discussing with educational side as well as officers at the ministry of health
- Setting up Continuing Professional Development (CPD) program
- Holding technical seminars and scientific meetings
- Setting up JAPO certification system for experts
- Publishing “PO Academy Journal”
- Publishing “JAPO triennium report” includes P/O needs-provision in the country
- Setting up related guidelines, such as Ethics, Role and Responsibilities of P&O profession in clinical practice
- Supporting Para Athlete, patient groups, people affected by disasters
- Creating relationships with stakeholders and other related organizations
- Creating international relationships in P&O field
- Lobbying
Current challenges include:

- Improvement CPD program
- Setting up a system to collect P/O outcomes as nation-wide
- Having stakeholders, such as the Government and the Ministry, appreciate properly value of services that P&O provides in clinical practice (They should put price on our services, not only on products.)
Gait Re-education Techniques and Gait Faults Following Lower Limb Amputation

Laura Burgess

Clinical Specialist Physiotherapist, Imperial College Healthcare NHS Trust, London, United Kingdom

It has been shown that daily prosthetic use is a key factor in people adjusting to lower limb amputation. Providing appropriate gait training might facilitate immediate and long-term adjustment (Sinha et al 2014). Locomotor capabilities with the prosthesis, walking distances and gait automacy are the main factors related to positive prosthetic rehabilitation outcomes. As Gailey et al (2013) conclude, gait training had a greater impact on positive work symmetry than different prosthetic feet. It is vital that amputees are taught the correct techniques to make the best use of their prosthesis and achieve an optimal gait pattern, level of function and assist with adjustment.

A multidisciplinary team approach to prosthetic fitting, alignment and rehabilitation is essential in assisting the user in achieving the best potential from their prosthesis. When physiotherapy starts during prosthetic provision, exercises to control posture, movement and weight transference often create a need to change prosthetic alignment.

Research has confirmed the asymmetrical nature of amputee stance with more weight being taken on the sound limb than on the amputated limb. There is a positive correlation between hip abductor muscle strength and weight distribution and gait measures, as well as hip musculature strength and balance contributing to improved walking speed, stride length and step frequency. These findings emphasize the importance of continued strength training of the hip musculature and balance work in gait re-education.

As part of the rehabilitation programme regular use of a treadmill can improve step length symmetry, increase in prosthetic stance phase and reduced energy expenditure (Darter et al). Roffman et al highlight that factors contributing to non-use of a prosthesis and those for consideration in gait re-education are: amputation above transtibial level; mobility aid use; dependence walking outdoors on concrete; very high number of comorbidities.
Balance ability and confidence are strong indicators of satisfactory prosthetic use and should be included in gait re-education and prosthetic rehab. Wong et al (2015) identified key specific relevant activities (three items of the Berg Balance test) are: turning to look behind; retrieving an object from the floor and stepping to place alternate feet on a stool.

Many gait faults seen in amputee rehabilitation are caused by inadequate weight transference over the prosthetic side. Prosthetic socket fit and correct training in prosthetic use are factors which relate to minimising sound limb loading. Promoting walking and activity in prosthetic users can improve physical fitness and ability to walk at their most economical walking speed (Wezenberg et al 2013).

This presentation aims to consider common gait faults and some of the gait re-education techniques that can be used by to assist amputees in achieving as near normal gait pattern as possible.
Ischial-Ramus Containment In Transfemoral Socket Designs

Marlo Ortiz
Ortiz Internacional S.A. de C.V.
Guadalajara Jalisco, Mexico

Summary: Since M.A.S. Socket introduction in 1999, its main objective was to have more ischial-ramal containment, which made the transfemoral amputee have more control over his/her prosthesis. And less in relation to lower trim lines to improved range the of motion, socket comfort, and cosmesis.

Introduction: This presentation will illustrate selected cases that have been fitted over the past years with different ages from kids up to geriatrics, different levels of amputations, from the shortest stump of 7 cm long up to knee disarticulations. These cases presentations will depict specific stump conditions, and how this innovative socket design improves the fitting of above the knee prosthesis by providing improved comfort, sitting, full range of motion, prosthetic control, improved gait, and excellent cosmesis.

We also will illustrate most common problems that we have found out in the socket shape

Methods: This systematic concept relies on the 3 M.A.S. principles: 1- Tri-planar congruity to contain the ischio-pubic ramus, 2- Adequate balance of the proximal 4 force vectors, 3- Hydrostatic weight bearing.

Casting technique should be more detailed in terms to capture the bony as well as the muscle anatomy, before we fill the negative cast it should be elongated to provide more space distally, details will be explained.

The anatomical shape of the socket is defined in every specific part of the anatomy of residual limb to create the adequate channels for the extensors, flexors, adductors, and control panels on both sides of the flexors and extensors channels
All this should be congruent with the ramus containment and its angle in relation to line of progression. It also has an important role in the balance of the 4 force vectors. Tension values are as usual accordingly to either skin fit or liner fit.

**Results**: Consequently besides ischial-ramal containment we have provided specific muscular channels with control panels at both sides for flexors and extensors muscles in order to allow the muscles to contract more efficiently with no restrictions, providing an efficient muscle strength, rotational control and less energy expenditure.

After wearing the socket for many years, the skin of the residual limb is usually healthy. X-rays have shown significant adduction of the femur inside the socket and confirmed that the ischial- ramal area has been effectively contained.

**Conclusion**: In summary we are fitting a socket with both muscle and bony lock to provide better prosthetic control ever, increasing stump muscle activity, less energy expenditure, besides the benefits already established in the MAS socket, and because the muscle lock the movement of femur is minimized as well.
Abstract:
AUN-HPN PO Group
An Overview of the Philippine School of Prosthetics and Orthotics: The First in the Philippines

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Introduction: In the Philippines, 1.443 million or 1.57% of the 92.1 million household population have a disability (Philippine Statistics Authority, 2013). It was also estimated that 41,551 (0.93%) of this population are physically impaired. Persons with physical or orthopaedic disability are those who have lost one or both upper or lower limbs, or may be a combination, or those who have been paralyzed affected in any part of the limbs. The need for assistive devices such as prostheses and orthoses is increasing, however, there are barriers or challenges that impede in attaining these services such as accessibility and the lack of prosthetics and orthotics training programs.

Background of UERM-PSPO: The Philippine School of Prosthetics and Orthotics was established in 2010, in partnership with Nippon Foundation and Exceed, and is the first school to offer a bachelor’s degree in prosthetics and orthotics in the Philippines. It is under the College of Allied Rehabilitation Sciences in the University of the East Ramon Magsaysay Memorial Medical Center, Inc., accredited by the Commission on Higher Education, and is recognized as a Category 1 program by ISPO. It is housed in a four-storey building holding two PO workshops, a physical therapy clinic, and a PO charity clinic. It also houses one of its features, a Motion Analysis Laboratory, for which students can utilize it to experience handling an advanced pressure and motion sensing technology for learning and research.

The BSPO Program: The Bachelor of Science in Prosthetics and Orthotics program is run by a 5-year curriculum (4 academic years and 1 internship year), and are facilitated by PO expatriates and local faculty who are also certified POs. PSPO has a multidisciplinary clinic and training laboratory for interns on which collaboration with the rehabilitation doctor, social worker, physical therapist, and a supervising certified prosthetist-orthotist is possible. After completing the program, the graduates will undergo a 1-year postgraduate internship in the Department of Physical Medicine & Rehabilitation
in the UERM Memorial Hospital, together with other rehabilitation specialists (PT, OT, and Speech Therapist), for further skills training and practice as they handle paying patients.

**Research Collaboration**: PSPO students have been actively engaging several institutions (such as the Department of Science and Technology) and the university’s research institute (UERM-Research Institute for Health Sciences) in creating research related in the field of prosthetics and orthotics. Some had the opportunity to present their research internationally (APOSOM and ISPO World Congress)

**Our Alumni**: As of 2014 the PSPO has a total of 45 graduates. The newly certified Category 1 clinicians are currently working in different fields—the academe and the clinic—to practice and continually expand and promote the profession. Some alumni work outside Metro Manila (Visayas and Mindanao) to serve PWDs. The other alumni work at UERM-PSPO as faculty members, teaching and facilitating future POs.

**Moving forward**: The curriculum had some changes abiding the Commission on Higher Education (CHED) rulings to improve on and ensure quality PO education for clinical excellence. Also adapting the country’s current PhilHealth program, aspiring clinicians continuously serve their clients by giving quality and cost-effective prosthetic and orthotic devices.
Development of Prosthetic and Orthotic (P&O) Education in Myanmar

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The University of Medical Technology Yangon (UMTY), Myanmar

Introduction: Myanmar Prosthetist and Orthotist is new cadre of health professionals, who are able to produce most appropriate prostheses and orthoses at the Rehabilitation Hospital to adequate the international (ISPO) standards throughout the country.

P&O Training and Educational Development: Since October 2000, there was first enrollment from 3 Myanmar candidates at the Cambodian School of Prosthetics and Orthotics (CSPO). There are 2 men from Ministry of Defend (MoD) and 1 man from Ministry of Health (MoH) which sponsored by the International Committee of Red Cross (ICRC). There were 19 graduates (7 females) among 27 candidates completely followed the full course training. Graduates are recognized internationally as P&O (ISPO Category II). There are 2 graduates (1 female) work as bench technician that was trained and they were commended by ISPO for Cat III.

The University of Medical Technology Yangon (UMTY), set up P&O department at the end of 2011. By 2015, there are 45 candidates interested to be a P&O professional. There are 11 students (1 male) of first batch were graduated in 2017. Currently, the department of P&O is providing training to 34 students. 12 students are in second year, 15 students are in third year and 7 students are at their fourth year class for final regular theory and practical exams in October 2018.

Physical Rehabilitation Services: In Myanmar, 2 Ministries (MoD and MoH) are supporting the rehabilitation centres. There are totally 9 workshops are established in the hospital and 1 P&O department in UMTY. According to WHO/ISPO figures, it is estimated that a minimum of 300 qualified Prosthetists-Orthotists are promoted to satisfy the eventual needs in Myanmar of the population over 60 million people. To summarize that the well trained qualified P&O are urgently needed in order to maximize the quality of life of
people with disabilities in association with upgrading rehabilitation service in Myanmar. Graduates work in the Physical Rehabilitation Hospital which support by the Exceed Worldwide and other organizations such as ICRC, and other local NGOs that are collaborated with MoH and MoD. Some of them have progressed to teaching or managerial positions, where their skills and knowledge can be passed to others.

**Conclusion :** The number of clients who came for rehabilitation services are bigger than number of P&O services providers for device prescription. The qualified P&O Cat I graduated from SSPO, P&O Cat II and Cat III graduated from CSPO are working at different rehabilitation hospitals throughout the country. The P&O service providers are limited to the number of the needed for people with disabilities. Therefore, P&O are quite far away to the WHO/ISPO target (a country requires 5-10 prosthetics and orthotics clinicians per million population) for 300-600 P&Os. The Government (MoH and MoD) plays an important role to develop and manage P&O service provider for the rehabilitation Hospital. Therefore, UMTY needs to progress P&O professional awareness to the foundation/first year University students for their interested in the future employment, such as professional promotion, encouragement and motivation to integrate to the Government sector. Whenever, the P&O fields are touched interest to the society for people with disability, then about 80% more for P&O upgrading will meet in the future industrialization. In long term perspective, the P&O department at UMTY will be run by the qualified national P&O lecturers (P&O Cat I) to faster grow P&O education. In addition, the Myanmar Physical Rehabilitation Association and ISPO Myanmar need strongly support to P&O field for sustainability.

Development of ASEAN University Network-Health Promotion Network- Prosthetics and Orthotic Group (AUN-HPN-P&O Group)

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The support of the Nippon Foundation made to train prosthetists/orthotists in various schools in the region is significant to develop professional existence and improve the accessibility and quality of service provision for people with disabilities in the region. The interest of the Nippon Foundation in promoting equity in harmonized social norms for an inclusive society.

The investment made by the Nippon Foundation through charity organizations impacts the local in need and the local governments by the demonstration of feasibilities of standards, quality, models and approaches toward disability and professional development in the region. The support given to the Alliance of Prosthetic and Orthotic School Asia (APOS) from 2005-2015 set a corner stone for this AUN-HPN-P&O Group.

The review of AUN-HPN PO Group with the aim to develop PO education networks across the ASEAN nations with a continuous motivation of collaboration and knowledge sharing in PO education, clinical service, community rehabilitation, research efforts and enhancement of quality of life of people with disabilities from childhood need to personal hobby interest.

The long term goal of the initiative to “Develop ASEAN network of Prosthetic and Orthotic care”

Goal 1 : Strengthen the curriculum for better delivery of PO education and Human Resource Capacity if PO educational institute in ASEAN region
Goal 2 : Promote and carry out collaborative research in the field of physical rehabilitation in ASEAN nations
Goal 3: Improve professional presentation and inclusion of Prosthetists/Orthotists in an interdisciplinary team approach to patient care

Goal 4: Contribute to the policy development in quality of care for PWDs for ASEAN national guidelines and WHO Standards

Goal 5: Elevate feasibilities, choices and equality of rehabilitation of rehabilitation intervention for PWDs in ASEAN nations

Planning for collaboration activities:

1. Educator Training on Theoretical teaching: 20 PO educators from six schools in the region will have an improved skills in Theoretical teaching

2. Educator Training on Clinical Skills teaching: 20 PO Clinical Mentors from Six schools in the region will have an improved skills in Clinical Skills teaching

3. Educator Exchange on Clinical Interns Mentorship: 10 Clinical Placement Mentors will be exchanged to different PO schools in the region

4. Regional Research Support: 6 schools in the regions will be supported with research grant

5. Regional Research Repository: PSPO will host/coordinate a repository page for regional research findings and a minimum of six research reports are posted on this regional research repository

6. Representing PO Group in AUN meeting: SSPO will represent PO group in AUN-HPN meetings
   - Dr. Nisarat will attend regular AUN_HPN meetings
   - Dr. Nisarat will share the minutes of these meetings will be shared to the PO group

7. Representing AUN-HPN PO Group in ISPO World Congress: Two representatives from AUN-HPN PO Group will be selected to present paper about this group at ISPO 2019

8. An annual AUN-HPO PO Group meeting with WHO and ISPO Regional Officer: 15 representatives from six schools, WHO and ISPO hold its first regional meeting on rehabilitation and PO Education

9. Support to National Associations for professional development activities: Six national PO associations are supported for their annual congress to help developing capacity building of their members
Kobe College of Medical Welfare,

Sanda Campus’s Education System

Shin Sasaki

Head of Prosthetics and Orthotics Department,
Kobe College of Medical Welfare Sanda Campus, Japan

The Prosthetics & Orthotics Department, Sanda Campus, is part of KCMW, one of the 70 technical colleges nationwide in the Jike Gakuen Group, Japan. KCMW has a total of three campuses in Kobe and Sanda cities and provides 9 courses under the allied health profession umbrella.

Since 1997, KCMW, Sanda Campus has been awarding graduates of their 3 year P&O programs a Technical Associate Degree. This degree is recognized both the Japanese Ministry of Education, and by the Ministry of Health. The Advanced Technical Associate Degree was created under 2005 guidelines by the Ministry of Education. This degree is for graduates of 4 year courses from institutions other than Universities. In preparation for awarding the Advanced Technical Associate Degree to KCMW students, the Prosthetics & Orthotics department established their 4 year P&O program in 2008.

KCMW, Sanda is a highly regarded provider of quality instruction within the P&O field in Japan. In addition to P&O programs, KCMW, Sanda also provides Physical Therapy, Occupational Therapy, Speech Therapy, and Paramedic Technical programs. The programs provided by KCMW run the whole gamut of health sciences. Students in these courses study health sciences in a highly integrated manner. This helps the students gain a better understanding of the function served by all health care workers. This in turn results in more favorable outcomes for patient care. Furthermore KCMW has orthopedic shoe technician course as well.
Venue: Narai Hotel
Address: 222 Si Lom, Suriya Wong, Bang Rak, Bangkok 10500, Thailand
APOS M 2018 : Exhibitors

1. Sirindhorn School of Prosthetics and Orthotics/Human Study e.V
2. ISPO International
3. Zy Movement Foundation
4. Össur Corporate
5. Novatec Healthcare Co., Ltd
6. Top Medicare Ltd
7. Massons Healthcare
8. Allard International
9. North Sea Plastics Ltd
10. Becker Orthopedic
11. ST&G USA Corp.
12. Ortec Co., Ltd.
13. Blatchford Group
14. Ottobock
15. Rodin 4D SAS
16. Ortocentrum
17. Sun Nature Care Co., Ltd
18. Orthopaedia Pte Ltd
19. UCP Wheels for Humanity-CLASP
20. PROACTIVE Technical Orthopaedics Pvt. Ltd
21. United BMEC (THAI) Co., Ltd
APOS M 2018 :
Oral Presentation and Poster presentation

APOS M 2018 :
Post-Meeting Survey

Scan me
(Post-Meeting Survey)