



Advances in Brachial Plexus Reconstruction
A Surgical Skills Course
April 23-25, 2020

Thursday, April 23, 2020	
7:00 a.m.	Registration & Breakfast <i>Marriott Ballroom, 2nd Floor</i>
Brachial Plexus: The Basics Moderator: Alexander Y. Shin, MD	
7:30 a.m.	General Session Begins – Introduction <i>Course Directors: Allen T. Bishop, MD, Alexander Y. Shin, MD, Robert J. Spinner, MD</i> <i>Leighton Auditorium, Siebens Building, 2nd Floor</i>
7:35 a.m.	Brachial Plexus and Spinal Nerve Anatomy <i>Milan Stevanovic, MD</i>
7:50 a.m.	Injury Mechanisms and Pathoanatomy: Common Patterns of Injury <i>Peter C. Rhee, DO</i>
8:05 a.m.	Birth Related Plexus Injury: Demographics, Risk Factors, Incidence <i>Scott Kozin, MD</i>
8:20 a.m.	Physiology of Lower Motor Neuron Injury: Nerve and Muscle Changes <i>Brian A. Crum, MD</i>
8:30 a.m.	Q & A <i>Milan Stevanovic, MD, Peter Rhee, DO, Scott Kozin, MD, Brian A. Crum, MD</i>
Adult and Neonatal Brachial Plexus Injury Moderator: Robert J. Spinner, MD	
8:40 a.m.	Functional Anatomy of Brachial Plexus: Common Patterns of Adult Injury Motor and Sensory Loss, Global, Upper, Terminal Branches <i>Andres Maldonado, MD</i>
8:55 a.m.	History and Physical Exam of Adult BPI: Exam with Patient Volunteer <i>Alexander Y. Shin, MD</i>
9:15 a.m.	Patterns of Injury in OBBP: Frequency, Factors Affecting Outcome <i>Jorge Clifton, MD</i>
9:25 a.m.	OBBP Case Examples <i>Scott Kozin MD</i>

9:35 a.m.	Vascular Injury in Adult BP: Acute Physical Exam, Role of Vascular Reconstruction at Injury or with Delay in Management/Associated Injuries <i>Allen T. Bishop, MD</i>
9:45 a.m.	Pain: Etiology (Deafferentation, Joint Subluxation), Quality, Severity, Location, Aggravating Factors, Time Course <i>Keith A. Bengtson, MD</i>
9:55 a.m.	Q & A <i>Andres Maldonado, MD, Alexander Y. Shin, MD, Jorge Clifton, MD, Scott Kozin MD, Allen T. Bishop, MD, Keith A. Bengtson, MD</i>
10:05 a.m.	Break & Exhibits Marriott Ballroom, 2nd Floor
Diagnosis of Brachial Plexus Injury Moderator: Allen T. Bishop, MD	
10:40 a.m.	Adult BPI: Nuances of BMRC, Issues in the Literature, What is the best way to measure outcomes? <i>Peter C. Rhee, DO</i>
10:55 a.m.	Examination of the Baby and Young Child: Role of Serial Assessments <i>Howard Clarke, MD</i>
Imaging and Other Nuances of Brachial Plexus Diagnosis Moderator: Angela Wang, MD	
11:10 a.m.	Cervical Spine MRI and CT Myelography of Brachial Plexus Injuries <i>Felix E. Diehn, MD</i>
11:25 a.m.	Ultrasound of the Brachial Plexus – Live Demo <i>Jay Smith, MD</i>
11:35 a.m.	Preoperative Electrophysiology <i>Brian A. Crum, MD</i>
11:55 a.m.	Other Evaluation: Pulmonary Function Studies, INSP/EXP Views, X-rays for Associated Injury <i>Angela Wang, MD</i>
12:10 p.m.	Role of the Therapist in Adult BP and OBBP Management Preoperatively <i>Kimberly N. Jensen, PT, CHT</i>
12:20 p.m.	Q & A <i>Felix E. Diehn, MD, Jay Smith, MD, Brian A. Crum, MD, Angela Wang, MD, Kimberly N. Jensen, PT, CHT</i>
12:30 p.m.	Lunch & Exhibits Marriott Ballroom, 2nd Floor
Surgical Decision Making in Adult Plexus Moderator: Eric Zager, MD	
1:30 p.m.	Understanding the Shoulder with Respect to BPI injury <i>Bassem T. Elhassan, MD</i>
1:40 p.m.	Timing of Surgical Intervention: When to Refer Your Patient, When to Operate <i>Eric Zager, MD</i>
1:50 p.m.	Exploration and Open (Intraoperative) Electrophysiology: Techniques, Significance and Value of SSEP, MEPs, Nerve-to-Nerve and Neuromuscular Stimulation <i>Robert J. Spinner, MD</i>

2:05 p.m.	Exploration Findings: Nerve and Vessel Appearance, Scar, Soft Tissues <i>Milan Stevanovic, MD</i>
2:15 p.m.	What Can We Do? Define and Inform Re: Initial Nerve Management Options: Nerve Graft, Nerve Transfer (Extra and Intraplexal), FFMT, Tendon and Joint Procedures in Adults <i>Angela Wang, MD</i>
2:30 p.m.	Indications/Contraindications/Priorities in the Adult <i>Andres Maldonado, MD</i>
2:50 p.m.	Postop Therapy of Brachial Plexus Patients <i>Kimberly N. Jensen, PT, CHT</i>
3:00 p.m.	Q & A <i>Bassem T. Elhassan, MD, Eric Zager, MD, Robert J. Spinner, MD, Milan Stevanovic, MD, Angela Wang, MD, Andres Maldonado, MD, Kimberly N. Jensen, PT, CHT</i>
Panel Discussion - Adult cases Moderator: Alexander Y. Shin, MD	
3:10 p.m.	Upper Trunk – <i>Milan Stevanovich MD, Angela Wang, MD , Eric Zager, MD</i> - Panel <ul style="list-style-type: none"> • Global Case 1: No Vascular Injury • Global Case 2: Vascular Injury • Delayed Treatment Case
3:50 p.m.	Break & Exhibits <i>Marriott Ballroom, 2nd Floor</i>
Operative Treatment of OBBP Moderator: Scott Kozin, MD	
4:20 p.m.	Indications for Surgical Reconstruction in OBBP: When to Observe and When to Operate <i>Howard Clarke, MD</i>
4:30 p.m.	Priorities and Reconstructive Options in Children with Erb's Palsy <i>Scott Kozin, MD</i>
4:40 p.m.	Erb's Case Study <i>Jorge Clifton, MD</i>
4:55 p.m.	Priorities and Reconstructive Options in Children with Global Palsy Group Discussion: Grasp Reconstruction in Child with Global Palsy (6 min each speaker) <i>Howard Clarke, MD, Scott Kozin, MD, Jorge Clifton, MD</i>
5:15 p.m.	Nerve Graft of Viable Root vs. Nerve Transfer: Case Presentation with Discussion <i>Howard Clarke, MD, Scott Kozin, MD, Jorge Clifton, MD</i>
5:35 p.m.	Adjourn

Friday, April 24, 2020		
6:45 a.m.	Breakfast & Exhibits Hot Topics - Questions from Participants <i>Marriott Ballroom, 2nd Floor</i>	
7:45 a.m.	Move to Stabile 9 Lab and Classroom	
Adult Brachial Plexus Stabile 9		
Group 1 8:00 a.m. – 9:30 a.m.	Group 2 8:00 a.m. – 9:30 a.m.	Therapist Track 8:00 a.m. – 9:30 a.m.
<u>Classroom:</u> Moderator: <i>Angela Wang, MD</i> <ul style="list-style-type: none">Outcomes of Nerve Grafting: Issues and Nuances (20 Minutes) <i>Eric Zager, MD,</i>Outcome of Nerve Transfers for Elbow Function (20 Minutes) <i>Angela Wang, MD</i>Outcome of Nerve Transfers for Shoulder Function (20 Minutes) <i>Allen T. Bishop, MD</i>Surgical Planning: Case Scenarios (60 Minutes)	<u>Hands-on Skills Laboratory:</u> Moderator: <i>Milan Stevanovich, MD</i> <ul style="list-style-type: none">Supraclavicular Approach: Demonstration and Lab <i>Robert J. Spinner, MD</i>Infraclavicular Approach: Demonstration and Lab <i>Milan Stevanovic, MD</i>Cable Graft Fabrication with Fibrin Glue and Grafting Methods <i>Alexander Y. Shin, MD</i>	<u>Classroom:</u> Moderator: <i>Angela Wang, MD</i> <ul style="list-style-type: none">Outcomes of Nerve Grafting: Issues and Nuances (20 Minutes) <i>Eric Zager, MD</i>Outcome of Nerve Transfers for Elbow Function (20 Minutes) <i>Angela Wang, MD</i>Outcome of Nerve Transfers for Shoulder Function (20 Minutes) <i>Allen T. Bishop, MD</i>Surgical Planning: Case Scenarios (60 Minutes)
9:30 a.m.	Break <ul style="list-style-type: none">Group 1 (Blue Group) Transition to LabGroup 2 (Orange Group) Transition to Classroom	
Group 1 10:00 a.m. – 11:30 a.m.	Group 2 10:00 a.m. – 11:30 a.m.	Therapist Track 10:00 a.m. – 11:30 a.m.
<u>Hands-on Skills Laboratory:</u> Moderator: <i>Milan Stevanovich, MD</i> <ul style="list-style-type: none">Supraclavicular Approach: Demonstration and Lab <i>Robert J. Spinner, MD</i>Infraclavicular Approach: Demonstration and Lab	<u>Classroom:</u> Moderator: <i>Angela Wang, MD</i> <ul style="list-style-type: none">Outcomes of Nerve Grafting: Issues and Nuances (20 Minutes) <i>Eric Zager, MD</i>Outcome of Nerve Transfers for Elbow Function (20 Minutes)	<u>Classroom:</u> Leighton Auditorium Moderator: <i>Stephanie Kannas, OTD, OTR/L, CHT</i> <ul style="list-style-type: none">Preoperative Brachial Plexus Rehabilitation (45 Minutes) <i>Stephanie Kannas, OTD, OTR/L, CHT</i>Postoperative Brachial Plexus

<i>Milan Stevanovic, MD</i> <ul style="list-style-type: none">Cable Graft Fabrication with Fibrin Glue and Grafting Methods <i>Alexander Y. Shin, MD</i>		<i>Angela Wang, MD</i> <ul style="list-style-type: none">Outcome of Nerve Transfers for Shoulder Function (20 Minutes) <i>Allen T. Bishop, MD</i> <ul style="list-style-type: none">Surgical Planning: Case Scenarios (60 Minutes)	Rehabilitation (45 Minutes) <i>Kim Jensen PT, CHT</i>
11:30 a.m.	Lunch & Exhibits <i>Marriott Ballroom, 2nd Floor</i>		
12:45 p.m.	Move back to Stabile 9 Lab and Classroom		
Advanced Brachial Plexus Issues & Proximal Nerve Transfer Techniques Stabile 9			
Group 1 1:00 p.m. – 2:30 p.m.		Group 2 1:00 p.m. – 2:30 p.m.	Therapist Track 1:00 p.m. – 2:30 p.m.
<u>Classroom:</u> <i>Moderator: Alexander Y. Shin, MD</i> <ul style="list-style-type: none">Distal nerve transfers <i>Robert J. Spinner, MD</i><ul style="list-style-type: none">Radial Nerve (10 Minutes)Ulnar Nerve (10 Minutes)Median Nerve (10 Minutes)Free Muscle Techniques and Results (20 Minutes) <i>Alexander Y. Shin, MD</i>Management of Neuroma Pain <i>Gregory Dumanian, MD</i>Late Reconstruction in OBBP: Shoulder, Elbow, Forearm and Wrist (20 Minutes) <i>William J. Shaughnessy, MD</i>		<u>Hands-on Skills Laboratory:</u> <i>Moderator: Jorge Clifton, MD</i> <ul style="list-style-type: none">Harvest of SPA and Transfer to SSN: Demonstration and Lab <i>Allen T. Bishop, MD</i>ICN Motor and Sensory: Demonstration and Lab <i>Angela Wang, MD</i>Biceps Motor Branch, lateral Cord Contribution to Median Nerve: Oberlin Transfer, Double Fascicular Transfer Demonstration and Lab <i>Jorge Clifton, MD</i>Triceps to Axillary (Leechavengvongs): Demonstration and Lab <i>Andres Maldonado, MD</i>	<u>Classroom:</u> <i>Moderator: Alexander Y. Shin, MD</i> <ul style="list-style-type: none">Distal nerve transfers <i>Robert J. Spinner, MD</i><ul style="list-style-type: none">Radial Nerve (10 Minutes)Ulnar Nerve (10 Minutes)Median Nerve (10 Minutes)Free Muscle Techniques and Results (20 Minutes) <i>Alexander Y. Shin, MD</i>Management of Neuroma Pain <i>Gregory Dumanian, MD</i>Late Reconstruction in OBBP: Shoulder, Elbow, Forearm and Wrist (20 Minutes) <i>William J. Shaughnessy, MD</i>
2:30 p.m.	Break & Exhibits Case Presentations by Faculty <i>Marriott Ballroom 2nd Floor</i>		
3:15 p.m.	Move back to Stabile 9 Lab and Classroom		

Advanced Brachial Plexus Issues & Proximal Nerve Transfer Techniques
Stabile 9

Group 1 3:30 p.m. – 5:00 p.m.	Group 2 3:30 p.m. – 5:00 p.m.	Therapist Track 3:30 p.m. – 5:00 p.m.
<p><u>Hands-on Skills Laboratory:</u> Moderator: <i>Jorge Clifton, MD</i></p> <ul style="list-style-type: none"> • Harvest of SPA and Transfer to SSN: Demonstration and Lab <i>Allen T. Bishop, MD</i> • ICN Motor and Sensory: Demonstration and Lab <i>Angela Wang, MD</i> • Biceps Motor Branch, Lateral Cord Contribution to Median Nerve: Oberlin Transfer, Double Fascicular Transfer Demonstration and Lab <i>Jorge Clifton, MD</i> • Triceps to Axillary (Leechavengvongs): Demonstration and Lab <i>Andres Maldonado, M.D.</i> 	<p><u>Classroom:</u> Moderator: <i>Alexander Y. Shin, MD</i></p> <ul style="list-style-type: none"> • Distal nerve transfers <i>Robert J. Spinner, MD</i> <ul style="list-style-type: none"> ○ Radial Nerve (10 Minutes) ○ Ulnar Nerve (10 Minutes) ○ Median Nerve (10 Minutes) • Free Muscle Techniques and Results (20 Minutes) <i>Alexander Y. Shin, MD</i> • Management of Neuroma Pain <i>Gregory Dumanian, MD</i> • Late Reconstruction in OBBP: Shoulder, Elbow, Forearm and Wrist (20 Minutes) <i>William J. Shaughnessy, MD</i> 	<p><u>Therapy Breakout Session:</u> Leighton Auditorium Moderator: <i>Stephanie Kannas, OTD, OTR/L, CHT</i></p> <ul style="list-style-type: none"> • Wearable Robotics to Control Elbow Motion and Gross Grasp <ul style="list-style-type: none"> ○ The orthotist's and prosthetist's role (45 minutes) <i>Andrew Nelson, CP, Orthotist</i> ○ The therapist's role (45 minutes) <i>Sonja Kranz, OTR/L, CHT</i>
5:00 p.m.	Adjourn	
6:30 p.m.	Reception Cambria Gallery	

Saturday, April 25, 2020

6:45 a.m.	Breakfast and Exhibits Hot Topics – Questions from Audience (All Faculty) Marriott Ballroom, 2nd Floor		
7:45 a.m.	Move to Stabile 9 Lab and Classroom		
Controversies in Brachial Plexus Reconstruction & Distal Nerve, Muscle/Tendon Transfers Stabile 9			
Group 1 8:00 a.m. – 9:30 a.m.		Group 2 8:00 a.m. – 9:30 a.m.	Therapist Track 8:00 a.m. – 9:30 a.m.
<u>Classroom:</u> <i>Moderator: Robert J. Spinner, M</i> <ul style="list-style-type: none">Controversies in BP Reconstruction (20 Minutes) <i>Robert J. Spinner, MD</i>Grasp: Should We Even Try? (20 Minutes) <i>Allen T. Bishop, MD</i>Case Presentations: Grasp (20 Minutes)Pain in BPI<ul style="list-style-type: none">Pharmacologic Management of Pain (15 Minutes) <i>Keith A. Bengtson, MD</i>Surgical Management of Pain (15 Minutes) <i>Eric Zager, MD</i>		<u>Hands-on Skills Laboratory:</u> <i>Moderator: Scott Kozin, MD</i> <ul style="list-style-type: none">Distal Radial Nerve Transfers: Demonstration and Lab <i>Jorge Clifton MD</i>Ulnar Nerve Transfers <i>Andres Maldonado, MD</i>Elbow Flexorplasty with Latissimus (DEMO ONLY) <i>Milan Stevanovich, MD</i>Inferior Trap transfer for external shoulder rotation (DEMO ONLY) <i>Bassem T. Elhassan, MD</i>TMR for Neuroma Pain (DEMO ONLY) <i>Gregory Dumanian, MD</i>	<u>Classroom:</u> <i>Moderator:</i> <ul style="list-style-type: none">Controversies in BP Reconstruction (20 Minutes) <i>Robert J. Spinner, MD</i>Grasp: Should We Even Try? (20 Minutes) <i>Allen T. Bishop, MD</i>Case Presentations: Grasp (20 Minutes)Pain in BPI<ul style="list-style-type: none">Pharmacologic Management of Pain (15 Minutes) <i>Keith A. Bengtson, MD</i>Surgical Management of Pain (15 Minutes) <i>Eric Zager, MD</i>
9:30 a.m.	Break <ul style="list-style-type: none">Group 1 (Blue Group) Transition to LabGroup 2 (Orange Group) Transition to Classroom		

Controversies in Brachial Plexus Reconstruction & Distal Nerve, Muscle/Tendon Transfers Stabile 9		
Group 1 10:00 a.m. – 11:30 a.m.	Group 2 10:00 a.m. – 11:30 a.m.	Therapist Track 10:00 a.m. – 12:00 p.m.
<u>Hands-on Skills Laboratory:</u> Moderator: <i>Scott Kozin, MD</i> <ul style="list-style-type: none"> Distal Radial Nerve Transfers: Demonstration and Lab <i>Jorge Clifton, MD</i> Ulnar Nerve Transfers <i>Andres Maldonado, MD</i> Elbow Flexorplasty with Latissimus (DEMO ONLY) <i>Milan Stevanovich, MD</i> Inferior Trap transfer for external shoulder rotation (DEMO ONLY) <i>Bassem T. Elhassan, MD</i> TMR for Neuroma Pain (DEMO ONLY) <i>Gregory Dumanian, MD</i> 	<u>Classroom:</u> Moderator: <i>Robert J. Spinner, MD</i> <ul style="list-style-type: none"> Controversies in BP Reconstruction (20 Minutes) <i>Robert J. Spinner, MD</i> Grasp: Should We Even Try? (20 Minutes) <i>Allen T. Bishop, MD</i> Case Presentations: Grasp (20 Minutes) Pain in BPI <ul style="list-style-type: none"> Pharmacologic Management of Pain (15 Minutes) <i>Keith A. Bengtson, MD</i> Surgical Management of Pain (15 Minutes) <i>Eric Zager, MD</i> 	<u>Therapy Breakout Lab Session:</u> <u>Gonda 15-440 & 15-427</u> <ul style="list-style-type: none"> Session 1: Sling and Orthosis Considerations – <i>Ann Lund, OTR/L CHT and Sonja Kranz, OTR/L CHT, Alpana Joshi, OTR/L CHT, Jennifer Stevenson, OTR/L, Heather Duyck, OTR/L</i> (60 minutes) Session 2: Use of Biofeedback and Electrical Stimulation – <i>Kim Jensen, PT, CHT</i> (30 minutes) Session 3: Breaking Down Surgical Reports and Developing a Treatment Plan – <i>Stephanie Kannas, CHT, OT, OTD</i> (30 minutes)
11:30 a.m.	Closing Discussion/Q&A Stabile 9 Classroom	
12:00 p.m.	Adjourn	

Breakout Session – Therapists Only Stabile	
12:00 p.m.	Lunch for therapists – Stabile 9
1:00 p.m.	Prosecution Cadaver Lab <i>Moderator:</i> Allen T. Bishop, MD ; Peter M. Murray, MD (90 minutes)
2:30 p.m.	Closing Remarks/ Q&A
3:00 p.m.	Adjourn