07:30 – 08:25  Registration
08:25 – 08:30  Opening Remarks – Paul Sagiv, Amiram Sagi

08:30-10:30  **Session I:** Chairpersons: Batia Yaffe, Maurice Aghasi, Efrat Ziv

08:30  **What’s New in Wrist Biomechanics**  Marc Garcia-Elias, Spain

08:50  **Dorsal Osteotomy of the Distal Radius Using two Plates in Extra Articular Mal Union**  Stephannie Romano, France

09:00  **The Clunking Wrist**  Marc Garcia-Elias, Spain

09:20  **Design and 3D Printing of a Dynamic Wrist Brace in the Dart Throw Motion Plane**  Sigal Portnoy, Israel

09:30  **A Treatment Algorithm for Scaphoid Fracture Nonunion**  Shai Luria, Israel

09:45  **Development of the Human Thumb**  Mirrit Mann, Israel

10:00  **Discussion**

10:30 – 11:00  **Coffee Break, Exhibition visit**

11:00 – 13:30  **Session II:** Chairpersons: Yoel Engel, Dan Hutt, Eti Schwimer

**Free Papers [presentation: 6 min, discussion 4 min]  Trauma**

11:00  **Distal Radioulnar Joint Instability. Pathomechanics and Treatment**  Marc Garcia-Elias, Spain

11:20  **Results after Surgical Treatment of Comminuted Intra-Articular Fractures of the Distal Radius**

**Bregman A., Abu-Dalu H., Lipsker E., Zinger G., Yudkevich G.**

ShaareZedek Medical Center, Jerusalem  
[ester48@netvision.net.il](mailto:ester48@netvision.net.il)

A retrospective survey was performed of patients who underwent surgery for displaced intra-articular fractures of the distal radius. Inclusion criteria included follow-up of minimum one year. Exclusion criteria included systemic soft tissue diseases such as Lupus, disabilities of the non-injured hand, and patients with communication disorders.

Patients were interviewed by telephone. Data gathered for analysis included the short Disability of the Shoulder and Hand score (DASH), Visual Analogue Score (VAS) for pain. Additional information included return to work, length of time out of work, esthetic satisfaction of wrist appearance and scar, overall satisfaction, and operative complications.

Some of the patients had delay in surgical treatment of more than 2 weeks because of logistical reasons. Results were analyzed for all patients and subsequently sub-divided to determine if delay to surgery had an impact on measured outcomes.

Post-operative complications were very low. Results showed a significant correlation between level of pain and overall satisfaction. There was a correlation between esthetic satisfaction and overall satisfaction, specifically in female patients.

11:30  **Distal Radius "Nascent" Dorsal MalunionTreated by Dorsal Plating and Rotated Bone Graft: Short Term Results with Ten Cases.**  Avshalom Carmel  
Laniado Hospital  
[clinic@handsurgeon.co.il](mailto:clinic@handsurgeon.co.il)

**Background:** Often, closed reduction and cast treatment performed in the ER for wrist fractures, leads to good position initially that is gradually lost during the first month. Some of these patients are seen late at 4-6 weeks, with an “unacceptable” deformity. Many surgeons hesitate to operate at this stage, and thus results may be compromised. Some authors recommend early operation early on these “nascent malunions”.

07:30 – 08:25  Registration
08:25 – 08:30  Opening Remarks – Paul Sagiv, Amiram Sagi

08:30-10:30  **Session I:** Chairpersons: Batia Yaffe, Maurice Aghasi, Efrat Ziv

08:30  **What’s New in Wrist Biomechanics**  Marc Garcia-Elias, Spain

08:50  **Dorsal Osteotomy of the Distal Radius Using two Plates in Extra Articular Mal Union**  Stephannie Romano, France

09:00  **The Clunking Wrist**  Marc Garcia-Elias, Spain

09:20  **Design and 3D Printing of a Dynamic Wrist Brace in the Dart Throw Motion Plane**  Sigal Portnoy, Israel

09:30  **A Treatment Algorithm for Scaphoid Fracture Nonunion**  Shai Luria, Israel

09:45  **Development of the Human Thumb**  Mirrit Mann, Israel

10:00  **Discussion**

10:30 – 11:00  **Coffee Break, Exhibition visit**

11:00 – 13:30  **Session II:** Chairpersons: Yoel Engel, Dan Hutt, Eti Schwimer

**Free Papers [presentation: 6 min, discussion 4 min]  Trauma**

11:00  **Distal Radioulnar Joint Instability. Pathomechanics and Treatment**  Marc Garcia-Elias, Spain

11:20  **Results after Surgical Treatment of Comminuted Intra-Articular Fractures of the Distal Radius**

**Bregman A., Abu-Dalu H., Lipsker E., Zinger G., Yudkevich G.**  
ShaareZedek Medical Center, Jerusalem  
[ester48@netvision.net.il](mailto:ester48@netvision.net.il)

A retrospective survey was performed of patients who underwent surgery for displaced intra-articular fractures of the distal radius. Inclusion criteria included follow-up of minimum one year. Exclusion criteria included systemic soft tissue diseases such as Lupus, disabilities of the non-injured hand, and patients with communication disorders.

Patients were interviewed by telephone. Data gathered for analysis included the short Disability of the Shoulder and Hand score (DASH), Visual Analogue Score (VAS) for pain. Additional information included return to work, length of time out of work, esthetic satisfaction of wrist appearance and scar, overall satisfaction, and operative complications.

Some of the patients had delay in surgical treatment of more than 2 weeks because of logistical reasons. Results were analyzed for all patients and subsequently sub-divided to determine if delay to surgery had an impact on measured outcomes.

Post-operative complications were very low. Results showed a significant correlation between level of pain and overall satisfaction. There was a correlation between esthetic satisfaction and overall satisfaction, specifically in female patients.

11:30  **Distal Radius "Nascent" Dorsal MalunionTreated by Dorsal Plating and Rotated Bone Graft: Short Term Results with Ten Cases.**  Avshalom Carmel  
Laniado Hospital  
[clinic@handsurgeon.co.il](mailto:clinic@handsurgeon.co.il)

**Background:** Often, closed reduction and cast treatment performed in the ER for wrist fractures, leads to good position initially that is gradually lost during the first month. Some of these patients are seen late at 4-6 weeks, with an “unacceptable” deformity. Many surgeons hesitate to operate at this stage, and thus results may be compromised. Some authors recommend early operation early on these “nascent malunions”.
**Objective:** to describe our results with dorsal plating and local bone graft to nascent malunion of distal radius fractures. (retrospective chart review. follow up 2-12 months)

**Method:** 9 patients (Age 50-70) with nascent dorsal malunions at 4-7 weeks post the fracture were operated between 2007-2013 by performing osteotomy through the fracture callus to correct radius alignment and using a trapezoidal corticocancellous bone graft from the distal radius turned 90 degrees to restore alignment, filing the donor defect with calcium hydroxyapatite and providing fixation by dorsal locked plate.

**Results:** all fractures united after 2-3 months. Most of the deformity was corrected. There were few complications: 1 suspected CRPS. 2 plate removals due to dorsal pain and stiffness. 1 had finger flexors clicking due to unaddressed prominence of the volar lip of the radius. there were no tendon ruptures.

11:40  **Titanium versus Stainless Steel Plating in 50 Consecutive Patients Treated Surgically for Distal Radius Fracture**

**Shakir S**, Neral MK¹, Naran S², Wollstein R¹²³

¹University of Pittsburgh, School of Medicine, Pittsburgh, Pennsylvania
²University of Pittsburgh, Department of Plastic Surgery, Pittsburgh Pennsylvania
³Carmel Medical Center, Division of Hand Surgery, Haifa, Israel

**Background:** Volar plates are the most commonly used modalities for operative fixation of distal radius fractures (DRF). To date, there is limited data regarding postoperative complications and subsequent removal specific to plate material.

**Objective:** Compare titanium and stainless steel plating of DRF.

**Null hypothesis:** there is no difference in postoperative hardware removal between plate types.

**Methods:** Fifty patients (2009 -2012) undergoing DRF repair were evaluated. Synthes 2.4mm titanium and stainless steel locking plates were utilized. The two cohorts were analyzed for differences in complications leading to hardware removal.

**Results:** Titanium was used in 22 patients and stainless steel in 28. Plates were 43 volar, 1 dorsal, 6 both. There was no significant difference in age, gender, plate location, length of follow-up between the two groups. Follow-up: 4.8 ± 5.6 months. Three titanium plates and 1 stainless steel plate were removed during the follow-up period. Mean time to plate removal was 18.4 ± 4.6 months. Reasons for hardware removal included chronic regional pain syndrome, tenosynovitis, carpal tunnel syndrome, decreased tendon excursion. There was no significant difference in removal rates between the two groups (p>0.186).

**Conclusion:**

- Preliminary analysis revealed no significant difference in removal, despite titanium plates requiring removal more often (13.6% versus 3.6%).
- These data support literature that suggests the soft tissue inflammatory response is similar regardless of plating material.

**Long-term follow-up may allow identification of significant differences.**

**Future studies should include longer follow-up and evaluation of radiographic plate prominence.**

11:50 **Efficacy of Using Compression Gloves Following Distal Radius Fractures on Rehabilitation and Functional Outcomes**

**Inbar Miller-Shahabar**, Haim Katsevman¹, Naomi Schreuer³, Beni Bernfeld², Anat Cons², Yael Raisman¹, Uzi Milman³

¹Occupational Therapy Department, "Lin" Medical Center (Haifa), Clalit Health Services. ²Orthopedic Department, Carmel Hospital and "Lin" Medical Center (Haifa), Clalit Health Services. ³Department of Occupational Therapy, Faculty of Social Welfare and Health Sciences, University of Haifa.

**Research Department, Clalit Health Services- Haifa and Western Galilee; Department of Family Medicine, The Ruth and Bruce Rappaport Faculty of Medicine, Technion - Israel Institute of Technology, Haifa.

**Background:** Distal radius fractures (DRF) often lead to increased swelling, reduced range of motion (ROM), joint stiffness and pain, which negatively affect daily functioning. Clinical observations by occupational therapists at the Lin Medical Center, Haifa, indicated that patients using made-to-measure compression gloves – originally fitted to reduce swelling or scarring – experienced decreased pain and improved ROM; such findings have yet to be reported in literature.

**Objective:** To test the effects of made-to-measure compression gloves on the rehabilitation of patients with DRF.

**Method:** In a randomized controlled trial, 37 people referred by orthopedic doctors following DRF were divided into two groups. Controls (N=15) received standard occupational therapy treatment following post-DRF protocols; trial group members (N=17) were additionally fitted with compression gloves. Efficacy of the gloves was assessed using questionnaires and standardized clinical tools. Additionally, the trial group underwent assessment of wrist/finger ROM with/without the gloves using the HandTutor™ System.

**Results:** Made-to-measure compression gloves were found to positively impact many rehabilitation outcomes, including reduced swelling (F(6,25) = 6.08, p<.001), increased wrist ROM (F(1,20) = 3.23, p<.05), reduced use of analgesics (p<.01), various hand functions (F(1,30)=7.78, p≤.01) and increased participation in ADL (F(1,30)=6.23, p<.05).
**Conclusion:** This pilot study confirms that compression gloves significantly improve daily functioning and reduce negative symptoms following DRF. It establishes clinical evidence for the use of compression gloves as a unique intervention in OT. It also sheds light on the impact of applied pressure on processes of tissue recovery, meriting further investigation.

**12:00 Removal of Volar Plates after Open Reduction Internal Fixation of Distal Radius Fractures**

Amir Shleifer, Asaf Kadar, Oleg Dollkart, Yishai Roseblatt, Dan Hutt, Tamir Pritsch

Hand Surgery Unit, Orthopedic Department, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel

**Background:** Removal of volar plates used to fix distal radius fractures is sometimes indicated.

**Objective:** To report our experience and identify the reasons for removal of volar plates. We questioned how often plate removal is related to preventable reasons such as plate and screw positioning, screw length, and quality of reduction.

**Methods:** All patients who underwent volar plate removal between the years 2006 – 2014 were identified. Patients' charts were retrospectively reviewed, and preoperative radiographs were analyzed including plate to volar rim distance (PVR), plate to critical line distance (PCR), Soong classification, and hardware prominence.

**Results:** A total of 48 patients (24 males, 24 females) were identified. Indications for plate removal included pain (37/48), limited range of motion (28/48), prominent hardware (16/48), tendon problems (rupture, irritation and tenosynovitis) (5/48), and infection (1/48). Preoperative radiographic findings included Collapse of the articular surface (12/48), prominent screws (37/48), protruding screws into the radiocarpal joint (8/48), and protruding screws into the distal radioulnar joint (6/48). The mean PCL was 4.21mm (-3 – 9.3mm), the mean PVR was 4.33mm (-3 – 14.7mm), and according to Soong's classification, 5 cases were grade 0, 21 cases were grade 1, and 22 cases were grade 2.

**Conclusion:** Preoperative radiographic analysis of the majority of volar plate removals identified hardware related positive findings. We assume that good fracture reduction, correct plate positioning, and appropriate screw location and length, can largely limit the need for volar plate removal.

**12:10 Finger injuries in "Mamanet" women netball league**

O. Bain, U. Farkash, A. Adler, P. Sagiv.

Hand Surgery Unit, Meir Medical Center, Kfar Saba Affiliated with Sackler Faculty of Medicine, Tel Aviv University

Acute finger injuries are very common in contact ball-sports including handball, soccer and basketball. They tend to be less frequent in non-contact ball sports like volleyball and netball. Articles about finger injuries in netball are published mainly in Australia, where this sort of sports is the most popular team sports, being played professionally and as a community sports.

In the last decade we witness a large worldwide increase in popularity of these sports in older women, including Israel. The participants are not required to be athlets. The only "iron rule" is that the players have to be mothers. The league is associated with their children elementary, "junior high" and highschool, so that the entire project is community-based.

Mamanet league” Israel started as a local idea in the town of Kfar- Saba and has expanded massively. Currently there are 24 teams in Kfar- Saba itself and almost 5000 participants spreaded in teams across the country. The league is based on practice and “friendly competitive” games.

As participation in the "mamanet league” expanded, we witnessed increasing number of finger injuries, which were treated mostly in the hand-clinic in Meir Hospital in Kfar- Saba. In the past year, we treated 9 women with 11 finger injuries. The age of the patients ranged between 33- 55 Y, mean of 43.7 Y. All the injuries took place during catching the ball and not during falling or hitting the ground.

All but one patient demonstrated peri-articular injury: 3 patients with 4 injured fingers demonstrated a bony mallet near the DIP, 3 had dorsal dislocation of the PIP and 2 had intraarticular fractures near the PIP. One patient demonstrated a long oblique fracture of the middle phalanx of the little finger involving the PIP. In 8 out of 10 injured fingers, the little finger was involved.

This unique group of patients put the top priority on function and quick return to sports as soon as possible. Further investigation and higher numbers of patients will enable to characterize those injuries more precisely and try to lower the incidence.

**12:20 Three-Dimensional Analysis of Acute Scaphoid Fracture Displacement**

Yonatan Schwarcz, Yael Schwarcz, Eran Peleg, 1Leo Joskowicz, 2Ronit Wollstein, Shai Luria

Hadassah-Hebrew UniversityMedicalCenter, Jerusalem, Israel

1School of Engineering and Computer Science, the Hebrew University, Jerusalem, Israel

2University of Pittsburgh School of Medicine, Pittsburgh, PA, USA

**Introduction:** Scaphoid fractures are common, and internal fixation is the preferred treatment for displaced fractures. Quantification of the mode of displacement of the scaphoid fragments may aid in correct surgical management. Previous studies have described the relative movement between the scaphoid fragments in fractures with nonunion. The goal of this study was to analyze the movement of acute scaphoid fracture fragments and adjacent bones relative to a common coordinate system.
Methods: All CT scans diagnosed with an acute scaphoid waist fracture during the study period were evaluated using the developed 3D model (Amira Dev 5.3, Mercury Computer Systems, Chelmsford, MA). The fractures were divided into displaced and nondisplaced fracture groups and were compared to a control group with no injury. Three anatomical landmarks were labeled on each of the distal and proximal fragments of the scaphoid as well as the lunate and trapezium. Four landmarks were marked on the distal radius articular surface. Each set of labels formed a triangle representing the bone or fragment. Virtual reduction of the fracture was conducted in the displaced fractures. A coordinate system based on the radius distal articular surface was used as reference. The position of each bone or fragment was calculated, using 6 variables, representing lateral, volar and distal motion; pronation, flexion-radial deviation, and rotation of the bone or fragment.

Results: In the displaced group, compared with nondisplaced and control groups, the proximal scaphoid fragment showed significant extension (25.1° and 25.2°; p<0.001), supination (7.1° and 7.5°; p=0.006) and volar motion (0.9 and 0.6 mm; p=0.037). The lunate showed supination (4.6° and 5.2°; p=0.058), similar to that of the proximal scaphoid fragment. The distal fragment and the trapezium showed no movement.

Conclusion: Measuring the displacement of the acute scaphoid fracture fragments and the adjacent bones relative to a common coordinate system revealed that the proximal scaphoid fragment is the one displaced, along with supination of the lunate. According to this data, concurrent reduction of the proximal scaphoid and lunate may be the more effective reduction maneuver. The developed 3D method can be a tool in the evaluation of the quality of reduction of the scaphoid fracture as well as other aspects of wrist biomechanics.

Figure 1 - Coordinate system based on distal radius articular surface.
Figure 2 – Three of six variables describing the bone location in relation to the coordinate system.
OBJECTIVES: Complex Olecranon fracture including fracture dislocation is usually associated with comminuted fracture of the radial head and may include fracture of the crooked and the capitellum. In reference to this injury pattern, the term “terrible triad of the elbow” has been coined in order to predict the potential for problems such as instability, joint stiffness, degenerative changes, myositis ossificans, post-operative infection, ROM limitation and etc. The treatment may include Radial head resection, internal fixation of the olecranon and debridement of soft tissue and bone fragment. The purpose of this study is to retrospectively evaluate the outcome of active patient who suffered from this injury and were treated surgically. 

METHODS: 11 patients who sustained Complex Olecranon Fracture with radial head FX were evaluated at an average follow up of 2 years. Clinical outcome measurements included elbow and wrist- stability, elbow and wrist range of motion, and patient satisfaction. Outcome was rated by using the disabilities of the arm, visual analog scale (VAS) questionnaires, radiographic evaluation and rate of complications. Radiographic evaluation includes X rays of the operated elbow and wrist, when indicated the uninjured contra- lateral limb was used for comparison. The Bado Classification system was used to evaluate the severity of the fracture.

RESULTS: 11 patients were clinically and radiographically. Average patient age was 50. All patients had an Olecranon and radial head fracture fractures. All patients had a Bado type IV fx’. 5 patients sustained fracture in the Capitelum as well, and 2 pat’ sustained a Coronoid fracture. 8 patients had a Radial head resection, 5 of them had radial head arthroplasty. Satisfaction was high with preliminary inquiry. Mean Arc of motion of the operated elbow was 18- 130 degrees. Mean pronation 75 degrees, mean supination 75 degrees. All the patients received physiotherapy for at list 3 months after the operation. The only complication was 1 post-operative infection that was treated for 10 days with oral antibiotic.

CONCLUSION: Complex Olecranon Fracture yields good long term functional outcome in young patients after ORIF with Radial head resection & radial head arthroplasty and olecranon’s plating. Comparing to the literature and the complexity of the fracture, Patients were generally satisfied, with no residual pain and good range of motion. Farther more, one can safely state that with an experienced surgeon there are minimal complications. A prompt surgical intervention is needed in the first 48 hours, but there is no need for emergency.
**Methods:** An isolated zone 1 flexor tendon injury was simulated in 16 fresh-frozen cadaveric fingers by transecting the FDPs 1 cm proximal to their insertion. The injury was reconstructed using a palmaris longus tendon graft to create a mechanical linkage between the interphalangeal joints, which restored coordinated interphalangeal joint flexion. Joint motion and the force required to flex and extend the fingers were tested before and after the tenodesis.

**Results:** Following the creation of an FDP zone I laceration, distal interphalangeal joint (DIPJ) flexion with load applied to the flexor digitorum superficialis tendon averaged 2°. The DIPJ flexion increased to a mean of 57° after the tenodesis procedure. The sum of metacarpophalangeal, proximal interphalangeal and distal interphalangeal joint flexion averaged 186° before the tenodesis and increased to 233° after the tenodesis.

**Conclusions:** The dynamic tenodesis technique successfully restored coordinated interphalangeal joint flexion after a simulated zone I FDP laceration in a cadaveric model, with improvements in distal interphalangeal joint flexion and composite finger flexion. Critical factors such as the effects of inflammation, edema, soft tissue healing, and scar formation could not be evaluated and may affect the outcomes of this procedure.

13:10 **Non-Operative Treatment for Pyogenic Flexor Tenosynovitis**

Sorin Daniel Iordache1,2, Tal Frenkel1, Eli Sidon3, Jacques Peylan1,2, Lior Paz1,2, Shai Shenes3

1Hand Surgery Service, 2Department of Orthopedic Surgery, Beilinson Hospital and Sackler School of Medicine, Tel Aviv University. sorindl@clalit.org.il

**Introduction:** Flexor tenosynovitis accounts for 2.5 to 9.4% of hand infections. Since the infection develops in a closed space, the literature stresses the importance of early operative intervention. Non-operative treatment which includes splinting and intravenous antibiotics is reserved for patients presenting within 24 hours from the beginning of the symptoms. In the last decade we have gained experience treating pyogenic flexor tenosynovitis with a less aggressive approach, starting with empirically chosen intravenous antibiotics regardless of the time from the onset of symptoms, reserving the surgical intervention either for patients presenting with skin necrosis, finger ischemia or abscesses or for patients who do not improve gradually with non-operative treatment.

**Methods:** The electronic medical records of the department of orthopedic surgery were searched for all patients diagnosed with pyogenic flexor tendon tenosynovitis from 2003 through 2013. The inclusion criteria were age above 18, a diagnosis of flexor tendon tenosynovitis and admission to the orthopedic department for treatment under intense supervision. Demographic parameters, the pre-admission medical treatment and the findings on physical examination at admission were collected from the individual medical charts. The primary treatment either intravenous antibiotic treatment or combined intravenous antibiotic and surgical treatment was noted. The intra-operative findings and the presence of complications were recorded. The range of motion was noted at final follow-up.

**Results:** Sixty patients, 43 males and 17 females at an average age of 48±17 years were identified. The patients presented at an average of 4.5±6.2 days from the onset of the symptoms. Fifty patients were treated non-operatively. The patients in the operative group had a more severe infection at presentation. Seven patients underwent surgery within 24 hours from admission, one within 48 hours and two at days 5 and 6, respectively. Two patients in this group underwent multiple procedures for debridement. The average post discharge follow-up was 45 days. Three patients in the non-operative group (6%) were re-admitted with recurrence of the infection, two of them with osteomyelitis. None of our patients underwent finger amputation and there were no ruptures of the flexor tendons. At the last follow-up there was a significant loss of extension in the operative group compared to the non-operative group.

**Conclusions:** Mild and moderate cases of pyogenic flexor tenosynovitis can be managed safely non-operatively with splinting, appropriate intravenous antibiotic treatment, and close supervision.

13:20 **The Use of Prophylactic Antibiotic in Treatment of Fingertip Amputation:**

A Randomized Prospective Trial

Guy Rubin, Hagay Orbach, Micha Rinott, Alejandro Wolovelsky, Nimrod Rozen, guy_ru@clalit.org.il

**Objective:** Fingertip amputation is common injury. Considerable controversy exists as to whether prophylactic antibiotics are necessary for this injury. Our goal was to compare the rate of infections among subgroups treated with and without prophylactic antibiotics. The study hypothesis was that infection rates were similar in the 2 groups.

**Methods:** This was a prospective randomized control trial of adult patients presenting with fingertip amputation with bone exposed, requiring surgical treatment. Patients were randomized to 2 groups: group 1 received no antibiotics, and group 2 received 1 gram intra-venous antibiotics (Cephazolin) for 3 days. The 2 groups were matched for age, time to surgery, injury mechanism and type of surgery. All surgical treatments were performed in the operating room, and all patients were reevaluated in our outpatient clinic in 10 days and again after a month. The primary outcome measure was the rate of infection at the end of follow-up.

**Results:** Fifty three patients were initially enrolled in the study, 2 patients were withdrawn before study completion, 27 subjects were randomized to the no-antibiotic group, and 24 subjects were randomized to the antibiotic group. No statistically significant differences on any baseline values were found between the 2 treatment groups. There was no infection in each group at the end of follow-up.
Conclusions: This study suggests that routine prophylactic antibiotics do not reduce the rate of infection after fingertip amputations with bone exposed treated surgically in the operating room. [29]

13:30 – 14:30  Lunch, Exhibition visit
14:00 – 14:30 Members only Meeting, Annual Report

14:30 – 15:30  Session III: Chairpersons: Shai Luria, Stephane Romano, Ayala Nota

Free Papers [presentation: 6 min, discussion 4 min]  Osteoarthritis, Rehabilitation

14:30  Modified Weilby Procedure as a Treatment of Basilar Thumb Osteoarthritis  M. Garcia-Elias, Spain

14:50  Surgical Treatment of Trapeziometacarpal Joint for Osteoarthritis by Trapezeectomy and Interposition of Polylactic Acid: Arex Trapezium Implant.
Lauren Gorelick1, Ayala Rozano-Gorelick2, Anwar Saab2, Edward Ram3  gorelick@netvision.net.il
1Hand Surgeon, Assuta Medical Center, Haifa, 2Clalalit Health Services- Bar Ilan Medicine Faculty, Zefat.
3Division of General Surgery, Rabin Medical Center- Campus Golda, Sackler School of Medicine, Tel Aviv University.

Osteoarthritis of trapeziometacarpal joint (TM joint), typically presenting with pain, reproducible tenderness in the region of the trapeziometacarpal joint, restricted the range of motion, deformation (shoulder sign) and grind test that causes crepitance and pain, is relatively common and affects 50% of postmenopausal women and up to 25% of elderly men. The aim of this study was to evaluate author's experience with arthroplasty as opposed to surgical treatment of degenerative disease of the TM joint. Authors have used Polylactic acid (PLA) braid rolled on itself AREX trapezium implant in Assuta Medical Center as part of surgical option together with trapezeectomy and arthrodesis in patients with Eaton type III-IV of trapeziometacarpal joint osteoarthritis.

Methods: 12 patients (11 female/1 male) were operated in Assuta Medical Center between 2009 to 2011.
Results: Pre-operation average DASH score were 80.4 (88-74).Following operation, the average degree of improvement in DASH score at six weeks was 32.8 (42-22), three months-20.7 (31-12) and one year-10.6 (5-13). All patients significantly improved after operation as measured with the VAS score. At one year follow-up all patients were free of pain.
Discussion: It appears that trapezectomy and interposition arthroplasty using AREX trapezium implant is highly efficacious for treating of osteoarthritis Eaton type III-IV of TM joint.

15:00  Dynamic Splinting for Forearm Supination
Shimrit Kaatabi, M.Sc., OT, Rosalie Halstuch, OT  shimrise@walla.com
Assaf Harofeh Medical Center, Affiliated to Sackler Faculty of Medicine
Tel-Aviv University

Limitations in rotational motion of the forearm can occur commonly after fractures or other injuries, and can severely impact quality of life. Stretching, exercise, moist heat, ultrasound, and other therapeutic techniques are the usual first line of treatment for this condition, but these may require a large amount of time for the patient and therapist, and may not always be successful. Dynamic splinting is a well established treatment for contracture by applying sustained force to the segment being mobilized.

The purpose of the lecture is to describe the use of the adjustable splint for forearm Pronation and Supination, in our clinic.

The presentation will include brief review of the importance of the Supination in ADL, a short description of the dynamic splints that are described in the literature, protocols, and the splint which is used in the Occupational Therapy Rehabilitation Center at "Clalit Medical services" and at the "Assaf Harofeh Medical Center". For the past year we have documented the progress of patients, with limited PROM and AROM in forearm supination, who were fitted with a dynamic prosupination splint.

15:10  Mallet Thumb – Controversies in Treatment
Daniel Dreyfuss1, Edward Calif2, Shalom Stahl2  d_dreyfuss@rambam.health.gov.il
1Orthopedic Department, Rambam Medical Center, Haifa, Israel
2 Hand Surgery Unit, Rambam Medical Center, Haifa, Israel

Compared to mallet finger injuries, rupture of the terminal part of the extensor pollicis longus tendon are rare. Few case reports have been described in the literature and cases involving tendon avulsions, open lacerations and fractures have been grouped together. There also remains no consensus regarding the different treatment options, which vary between splinting alone, open tendon suture and supplementary Kirshner wire fixation of the interphalangeal thumb joint.

In this review we present a case series of several mallet thumbs treated in our department, characterize the injury and compare the results of conservative and surgical treatment. Since the cases involving closed avulsions were
amendable to splinting and had satisfactory final results, we advocate reserving surgical treatment for open injuries, neglected cases, and unsuccessful conservative management.

15:20 The Influence of the “Wide Awake” Local Anesthesia Technique on the Practice of Hand Surgeons in the Ambulatory Operating Room - a Single Center Experience

Uri Farkash, Orit Bain, Avraham Adler, Paul Sagiv
Hand Surgery Unit, Meir Medical Center, Kfar Saba Affiliated with Sackler Faculty of Medicine, Tel Aviv University

**Background:** Historically, surgeries done under local anesthesia in the ambulatory operating rooms in our hospital were limited to short procedures, like carpal tunnel or trigger finger release. The reason for this practice was that these surgeries were done under tourniquet control, and patients were able to bare the tight constricting feeling for about 10 minutes.

**Methods:** The recent introduction of the “Wide Awake” local anesthesia technique has enabled us to perform a variety of more complicated and longer procedures, previously done under general anesthesia, in the ambulatory operating room. These include suture of flexor tendons and digital nerves, arthrolisis and tenolysis in the hand, fasciectomy of Dupuytren’s contractures, trapeziectomy, removal of internal fixation from the forearm, and more.

**Results and Conclusions:** Our daily practice of using the Wide Awake technique will be presented for the time period of the last 7 months, as well as our insights, short term results and our conclusions regarding the comparison to the previous common practice.

15:30 Wide Awake Local Anesthesia No Tourniquet [“WALANT”]: Our Experience in a Community Hand Surgery Service

Uriel Dreyfuss1, Daniel Dreyfuss2, Liliane Kaufman3, Nimrod Rozen1
dreyfuss@bezeqint.net
Department of Orthopedics, Zewulun Multidisciplinary Clinic, Kiriat Mozkin.
Division of Orthopedic Surgery, Rambam Medical Center, Haifa
Surgical Suite Unit, Zewulun Multidisciplinary Clinic, Kiriat Mozkin.

Performing hand operations under local anesthesia with Lidocain and Epinephrin, without using the tourniquet, [“WALANT”] is a technique that was popularized during the last 10 years by Donald Lalonde MD, who introduced it in Israel in 2013. Since then, a number of hospital-based hand surgery services started to use this technique. This is the first report on using WALANT in a community multidisciplinary Center. We describe the principles of WALANT and some modifications that had to be undertaken, in order to utilize WALANT in a Community medical set up. Further on, we report on the first 100 patients who underwent different hand surgery procedures under WALANT.

15:40 – 16:00 Coffee Break, Exhibition visit

16:00 – 17:30 Session IV: Chairpersons: Shalom Stahl, Shaul Goldsztein, Hanna Melchior

Free Papers [presentation: 6 min, discussion 4 min] Nerve, Pediatric

16:00 Unique Method for Wound Dressing and "Soft-Rigid" Fixation

E. Lipsker
herug23@szmc.org.il, ester48@netvision.net.il
Hand Surgery Unit, Shaare Zedek Medical Center, Affiliated with the Faculty of Health Sciences Hebrew University

A long term experience of several utilizations of "Coban” bandaging combined with sponge is presented. The presentation contains a Video guide

16:10 Intra-Plexal Nerve Transfer for Elbow Flexion and Supination in Neonatal Brachial Plexus Palsy

Amir Arami, Shelly Gurevitz, Batia Yaffe
Amirarmi@gmail.com
Department of Surgery of the Hand, Sheba Medical Center, Affiliated with Sackler Faculty of Medicine, Tel Aviv University

Intra-plexal nerve transfers using ulnar and/or median nerve fascicles to restore elbow flexion have been widely used following traumatic barchial plexus injury, but their utility following neonatal brachial plexus palsy remains unclear. Few studies support the hypothesis that these transfers can restore elbow flexion and supination in infants and children with neonatal brachial plexus palsy. We report on 3 children with neonatal brachial plexus palsy treated in our center with intra-plexal nerve transfer
for elbow flexion. Ulnar and/or median nerve fascicle transfers were able to effectively restore functional elbow flexion and supination in all three cases with late presentation following neonatal brachial plexus palsy.

The Utilization of Ilizarov Technique for Complicated Cases of Syndactyly
E. Lipsker, 1 Pichkhadze
Hand Surgery Unit, ShaareZedek Medical Center, affiliated with the Faculty of Health Sciences Hebrew University

The purpose of this technique is to expand scared/shrunken skin before separation of syndactyly. We will present the method and clinical cases that were operated according to this technique.

Paediatric Wrist Sprain
Michael Elvey, 1 Shelain Patel, 2 Erez Avisar, 1 Elliot Sorene
1 University College London Hospital, 2 Asaf Haroofeh Medical Center, Sackler Medical School, Tel Aviv University

Introduction: A wrist sprain is defined as ‘a partial ligament injury of the wrist without positive plain radiographic findings’. This diagnosis is frequently applied to children in whom initial radiological signs of bony pathologies frequently relate to the healing process. Previous MRI studies investigating the patho-anatomy of acute wrist sprains have found the definition to be inaccurate in up to 80% of cases. No studies have focused on paediatrics where current consensus opposes initial MRI due to infrequent subsequent management change. Our primary objective was to assess the impact of early MRI for paediatric wrist trauma. Secondarily we document for the first time the range of paediatric pathologies observed on MRI and compare findings with published adult data.

Methods: A retrospective study was performed on patients below 16 years from 2011-14 within two weeks of wrist trauma. MRI was performed on all patients with negative presenting radiographs. 57 patients with a mean age of 12 years were included. Data was recorded on clinical diagnosis, diagnosis following MRI, initial treatment, method of follow up treatment following MRI, and complications. A Cohen’s kappa coefficient was used to calculate the agreement between initial and final diagnosis.

Results: 75.4% of patients had positive MRI findings with a median of 1 (1-3) finding per patient. MRI differed from clinical diagnosis in 70.2% of cases. Cohen’s kappa coefficient between initial and final diagnosis was 0.126 (95% CI: 0.040 - 0.212). Occult fracture incidence was 36.5 %. Children were twice as likely to sustain occult fractures of the distal radius as of the scaphoid with a narrower scope of affected bone than adults. Bone contusion incidence was 35.0%. Adult and paediatric incidence was similar with paediatric preponderance for the distal radius over the scaphoid and fewer multiple contusions. Soft tissue injury incidence was 14.5%, approximately half of that witnessed in an adult population. Soft tissue injuries were always associated with an occult bony injury. MRI findings effected management change in 35.1% of cases.

Conclusion: The absence of any isolated soft tissue wrist injury resulted in the current definition of wrist sprain being inaccurate in all cases and therefore inapplicable in a paediatric population. We suggest a redefinition of a paediatric wrist sprain as ‘a symptomatic wrist injury without radiological abnormality’. Other injuries should be separated from this definition to avoid confusion. Our findings support the consensus that acute MRI rarely influences initial management however alternative benefits were witnessed.

Marc Juvenspan, 1 Charles Schlur, 2 Patrick Houvet, 2 Stéphane Romano
1 Institut Français de Chirurgie de la Main, 5 bis rue du Dôme, 75116 Paris
2 Clinique La Montagne, Courbevoie

The purpose of this study was to evaluate the feasibility and risks of percutaneous trigger finger release using a new instrument. A new designed tool was used to release the A1 pulley on hundred fingers from cadaveric subjects. The procedure led to complete A1 pulley release in 98%. The flexor digitorum profundus tendons and the neurovascular bundles were never found to be injured. Seven superficial abrasion of superficial tendon were found. The technique seems to be effective, convenient, safe and cheap.

Hand Rehabilitation after Radial Nerve Conservative Treatment and Rehabilitation versus early Tendon Transfer.
Yafir Levanon PhD, Dalit Shefer Eini, Ruth Amram, Paula Grunbaum, NetaKravitz
Occupational Therapy Department, Sheba Medical Center, Ramat Gan
Occupational Therapy Department, Tel Aviv University, Tel Aviv

Background: Rehabilitation after Radial nerve injury often includes; edema control, preventive positioning splints, wrist and finger flexors strengthening, passive range of motion, muscle strengthening according to the nerve regeneration and functional exercises. Various rehabilitation program and splinting methods were described in the literature, regarding the timing of nerve reconstruction and rehabilitation methods.

Objective: The following case studies aim to discuss the rehabilitation process after Radial nerve injury, rehabilitation during conservative treatment vs. rehabilitation after tendon transfer.
Method: presenting three case studies and discuss the above mentioned title with updated literature review. Discussion: Rehabilitation progress, such as intensive treatment plan, using TENS and particularly fitting of splints, is part of the rehabilitation when conservative treatment is the method chosen. Splitting is necessary following Radial nerve injury, and it depends on which type is more suitable for each case. The question about using a static splint for stabilization of the wrist or a dynamic splint that maintains the normal tenodesis pattern is relevant and there is no right answer. Another question that remains controversial and with no right answer is about the timing of tendon transfers for radial nerve palsy. Many authors defend that an early surgical procedure can be successful, and others prefer in a conventional approach, to delay any tendon transfers until reinnervation of the most of the proximal muscles. In both cases (surgical intervention with tendon transfer or spontaneous healing) we have support in literature that they can be successful. These facts bring us to the question above.

A Comparison of Histological Methods for Evaluating Axon Density in Peripheral Nerve – a Rat Sciatic Nerve Model
Avraham Cohen, Ariel Kerpel, Ido Volk, Shai Luria
Department of Orthopaedic Surgery, Hadassah-Hebrew University Medical Center, Kiryat Hadassah, POB 12000, Jerusalem, Israel 91120

Background: Peripheral nerve injuries are common and can cause substantial long-term disability and pain. Research into diseases and injuries of peripheral nerves and possible treatments thereof, hinges on scientifically sound, reliable modalities of assessing nerve functionality and microanatomy. A key method in evaluation of nerve regeneration is the evaluation of axon density in nerve cross sections. Formal quantification of axons is classically performed by toluidine blue staining even though this technique is considerably time-consuming and more expensive then immunohistochemical or immunofluorescence techniques that are used extensively in neuropathology. Immunofluorescence staining may have the additional advantages of differential axon count as well as fluorescent techniques of automated axon count. Our hypothesis was that using immunofluorescent stains, evaluation of axon density is as accurate as Toluidine Blue staining.

Methods: Seven wild type rats underwent a unilateral crush injury of the sciatic nerve. The nerves were harvested at either 1 or 3 weeks post insult, including segments proximal and distal to the injury site and from the contra lateral (uninjured side, designated control). Each segment was divided into two parts and fixated either for the toluidine blue (TB) staining or for 2 types of immunofluorescent staining with axon-specific antibodies (anti-Neuro Filament (NF) and anti-Protein-Gene-Product 9.5 (PGP)). Manual axon count was performed and compared between the groups using Pearson as well as Spearman’s rho correlation measures.

Results: We found a high correlation between the immunofluorescent stains and the toluidine blue for all segments including those distal to the injury. Comparing NF with TB, yielded a Pearson’s coefficient of 0.992 (p<0.001) for proximal, 0.857 (p=0.029) for distal and 0.977 (p=0.001) for control segments. Comparing PGP with TB yielded a Pearson coefficients of 0.767 (p=0.044), 0.915 (p=0.011) and 0.968 (p<0.001) for proximal, distal and control segments, respectively.

Discussion: We found that immunofluorescent staining resulted in comparable estimation of axon counts in peripheral nerve, as the toluidine blue stain, regardless of the injury. Immunofluorescence techniques may be a more affordable tool for the analysis of peripheral nerve injury and regeneration.

Carpal Tunnel Release: Avoid Complication with a Fysical Barrier
Iñaki Arrotegui, Juan Manuel Herrera
Neurosurgery, Hospital General Universitario de Valencia, Spain

A thorough knowledge of the anatomy of the carpal tunnel is essential in order to avoid complication and to ensure optimal patient outcome. There are many strong arguments for open (Short Incision 3 cm) vs conservative treatment. Nerve conduction studies (NCS). Have potentially great value in selecting patients for a specific treatment and in objectively assessing the efficacy of treatment in Carpal tunnel Syndrome. Release of the transverse carpal ligament can be performed safely under local anesthetic.

Study Objective: The objective of this retrospective clinical study was to investigate the potential benefits for complications (Adherence of the flexor tendons and severing scarring involving the median nerve. of using the Collagen Layershield as an adhesion barrier following mini open carpal tunnel release.)

Materials and Methods: Retrospective patient data was used. The study cohort (collagen matrix ) consisted of consecutive patients (100 patients) who were treated with collagen layershield. Patients underwent carpal tunnel surgery same technique in both groups and completed follow-up evaluations at no less than 6 to 12 months post-operation.

Results: Numbness and paresthesias were relieved in 89% DG group and 86% in Control Group; pain was relieved in 89% DG and 82% CG. Motoric Weknes was relieved in 95% DG and 88% CG. Normal grip strength was found in 93% DG and 91% had normal pinch strength. The difference in re-opration rate between the collagen matrix group and the standard procedure group is statically significant (P0.01).

Conclusions: Findings in this study (reduced pain and lower incidence of adhesions) are consistent with the Collagen Matrix acting as an effective adhesion barrier by preventing median nerve adhesions.
Technical Details, Short Term Results and Complications of Carpal Tunnel Release Surgery by Innovative Equipment.
Avshalom Carmel
Assuta Hospital and Laniado Hospital

Background: CTR can be achieved by open or endoscopic techniques alike. Currently, many surgeons use "midi open" technique and cut the TCL by scissors in a "semi blind" way, thereby potentially exposing the median nerve to harm.

Objective: to describe a surgical technique using modified innovative instruments for open CTR and shows its safety profile.

Method: Introspective chart review. Over a 10 year period, I operated around 400 patients for CTR utilizing a Smiley knife (meniscotome) and special cannulas developed from a knee arthroscopy trocar and a urologic tool. 200 patients were evaluated after 2 weeks for clinical results and short term complications, by sensory testing SWMF, evaluation of strength of APB and fingers and wrist motion. Complications such as hematoma, sensory loss or motion loss were noted. Patients were asked if they felt improvement relative to pre-op complaints of pain and numbness.

Results: the method was proved to be safe: complications were rare and most were minor: (1 wound infection, 1 transient paresthesia in ulnar nerve territory. 1 transient paresthesia in 3rd finger, 1 possible CRPS) No patient had damage to median nerve or motor branch.

Conclusion: this proved to be a safe and technically easy way to perform CTR. It is also low-cost and can also be done with slight modification with standard tools readily available on the shelf. Long term results will hopefully be reported in the future.

Surgical Outcomes of Carpal Tunnel Decompression in Patients with Established Nerve Conduction Block
Eran Assaraf, E. Lin, B. Friedman, Ran Atzmon, G. Agar, M. Agahsi, E. Avisar
Orthopedics Division, Asaf Harofe Medical Center, Israel

Background: Nerve Conduction Study has been used to support the diagnosis of Carpal tunnel syndrome (CTS), which is a common entrapment neuropathy. There is a paucity of data regarding the surgical carpal tunnel release outcomes of patients with sustain CTS who exhibit nerve conduction (NC) block. The purpose of this study is to prospectively characterize and evaluate the clinical outcomes of these patients (defined NC block group) as comparing with patients with CTS who did not present NC block (defined as control group).

Methods: Overall 34 patients underwent open carpal tunnel release, 28 females and 6 males, 15 of the patients had preoperative NC block, and the rest 19 patients did not have NC block. Clinical outcome measurements included the Levine-Katz symptom and function score, ranging from 1 point (best) to 5 points (worst) as measured an at average time of 10 month after operation.

Results: The mean Levine-Katz symptom score was 1.675 ±0.8 in the NC block group comparing to 2.21±1 in the control group. The mean Levine-Katz function score was 1.96 ±0.78 in the NC block group comparing with 2.36±1.17 in the control group. Both did show statistically significant, P=0.1 and 0.265 respectively. The most common symptom related complaint was weakness of the hand; the least common symptom was nocturnal pain.

Conclusions: At average postoperative time of 10 month following open carpal tunnel release, no inferiority found in the outcomes of patients with preoperative NC block comparing with those who did not have preoperative NC block.

Closing Remarks