

Scientific Paper Session: Lower Extremity  
Tuesday January 27, 2015  
9:45am-11:00am

**9:45 AM - 9:49 AM**

Treatment of extended osteochondral defects of talus by a free vascularized medial femur condyle

University Hospital Basel, Basel, , Switzerland

Dirk J. Schaefer, MD; University Hospital Basel; Beat Hintermann, MD; Basel University

**Background:** Large osteochondral lesions (OCDs) of the talar shoulder, with their size and articular cartilage geometry, as well as the loss of the medial or lateral articular buttress often preclude treatment with traditional osteochondral autograft techniques. We hypothesized that transplantation of a vascularized corticoperiosteal graft from the ipsilateral medial femur condyle is a viable treatment option for patients with such lesions.

**Methods:** A prospective study was conducted in a consecutive series of 14 patients (females, 5; males, 9; age 34.8 [20 - 54] years) who underwent this procedure between 2004 and 2011. The Visual analog scale (VAS) for pain and the American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score were administered. Radiographs and CT scans were assessed for graft incorporation and joint deterioration.

**Results:** The talar contour was successfully reconstructed in all patients and a stable incorporation of the vascularized corticoperiosteal graft was found in all patients. There was no joint degeneration seen in all but one ankle. While the VAS for pain decreased from 5.8 (5 to 8) to 1.8 (0 to 4), the AOFAS hindfoot score increased from preoperatively 65 (41 to 70) to 81 (54 – 92) at latest follow-up of 4.1 (2 to 7) years.

**Conclusions:** Treatment of large OCD of the talus by a vascularized corticoperiosteal graft from the medial condyle of femur was found to be a safe and reliable technique to restore the contour of the talus and its shoulder, and to get a stable incorporation in the badly vascularized host bone. Also the obtained pain relief and function are promising at mid-term.

## **9:49 AM - 9:53 AM**

Local perforator flaps in lower leg reconstruction

University of Medicine Cluj Napoca, Clinic of Plastic Surgery, Cluj Napoca, , Romania  
Alexandru Georgescu, Prof, MD, PhD; Ileana Matei; Irina Capota; Filip Ardelean; UMF Iuliu Hatieganu

### **Introduction**

Perforator flaps represent the latest surgical discovery in soft tissue defects coverage all over the body. These flaps were initially used as free microsurgical transfers, but it was proven that could be successfully performed as local and regional flaps. We will try to demonstrate that the propeller perforator flaps can be used with great results in covering selected cases of soft tissue and composite defects in the lower limb.

### **Material and method**

We performed perforator flaps based on perforators emerging from the peroneal, anterior and posterior tibial arteries in 117 cases with complex tissue defects in lower leg. Eighty-six flaps were used as propeller flaps, and 31 were advanced or rotated between 30° and 90°. The donor area was directly closed in 28 cases, in 15 cases skin grafted, in 74 cases skin grafted and direct sutured. The main steps in harvesting such a flap are: a. exploratory incision; b. microsurgical dissection in the attempt to find the perforator; c. final design of the flap; d. rotation or advancement of the flap into the defect.

### **Results**

In 93 cases the flaps were completely viable, in 21 cases we encountered a superficial flap necrosis, solved with secondary skin grafting, and 3 flaps were completely lost, needing another surgical procedure to solve the case.

### **Conclusions**

The local/regional perforator flaps gained a big popularity in the last years, due to their main advantages: 1.the source artery and underlying muscle and fascia are sparing, 2.very good blood supply, 3.replace like with like, 4.donor-site in the same area, 5.possibility of completely or partially primarily closure; 6.less demanding from technical point of view, because they are microsurgical procedures, but without microvascular sutures, 7.shorter operating time.

## **9:53 AM - 9:57 AM**

Lessons Learned from Two Hundred Medial Sural Artery Perforator Flaps

Chang Gung Memorial Hospital & Chang Gung University, Taipei, , Taiwan

Nidal F. AL Deek, MSc, MD; Chih-Hung Lin, MD, FACS; Chung-Chen Hsu, MD; Yu-Te Lin,

MD; Fu-Chan Wei, MD, FACS; Cheng-Hung Lin, MD; Chang Gung Memorial Hospital & Chang Gung Medical College & University

**Introduction:** The medial sural artery perforator (MSAP) flap is considered an excellent choice for defects that need thin and pliable soft tissue coverage. Flap versatile design is represented in the ability to harvest multiple tissue components in various combinations but from the same wound. Since its introduction in 2001, flap anatomy has been reported to be consistent with infrequent anatomic variations. The authors present the largest clinical series on this flap ever reported in the literature.

**Patients and Methods:** Between 2005 and 2014, two hundred MSAP flaps were harvested and transferred for reconstruction of hand, knee, foot, tongue, lip, and buccal defects. The flap was harvested either conventionally or endoscopically-assisted. Flap survival, complications, anatomic variations, and subjective patients' satisfaction were all studied.

**Results:** Male patients consisted 85% of the study group. MSAP flap was used for extremity reconstruction (34%) and head and neck reconstruction (66%). The flap was harvested classically (86%) and endoscopically assisted (14%). There was no perforator injury, insufficiency or absence in endoscopically-assisted group. But no suitable perforators were encountered in 12 cases of conventional-harvest group; either anterolateral thigh flap or radial forearm flap was used instead. All transferred flaps survived except 4 (98% success rate). Flap congestion occurred in 14 cases (7%) but all were successfully salvaged. In 4 cases, the dominant perforator had origin from the posterior tibial artery, and all were successfully harvested as free posterior tibia artery perforator flaps. Hypertrophic scars and skin grafts at the donor site decreased patient's satisfaction significantly.

**Conclusion:** The MSAP flap is good for small-to-medium-sized soft tissue reconstruction. Primary closure of the donor site should be made a prerequisite for flap selection. Endoscopically assisted flap harvest is safer than the conventional approach. Anatomic variations in this flap should be expected and prepared for in surgical plan.

**Level of Evidence:** Therapeutic, level IV

**9:57 AM - 10:03 AM**

**Discussion**

**10:03 AM - 10:07 AM**

Prospective, Routine Screening for Deep Venous Thrombosis Following Reconstruction Using Lower Extremity Free Flaps: Preliminary Results

University of Colorado, Aurora, CO, USA

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**Background:** Deep venous thrombosis (DVT) is a leading cause of hospital-associated morbidity and mortality and has been reported with an incidence ranging from 1 to 6% in patients undergoing microvascular reconstruction. The purpose of this study was to investigate

the incidence of symptomatic and asymptomatic DVT in patients undergoing reconstruction with a lower extremity free flap.

**Study Design:** Retrospective review of 56 consecutive patients undergoing reconstruction using lower extremity free flaps between October 2011 and January 2014 was performed to determine the incidence of symptomatic DVT. These patients were only screened for DVT based on asymmetric swelling, warmth, or tenderness in the extremities or for pulmonary embolism in the presence of tachycardia, chest pain, and shortness of breath. Prospective evaluation of a similar consecutive population of 10 patients treated between February 2014 and May 2014 was also performed to determine the incidence of asymptomatic DVT. These patients underwent routine duplex ultrasonography of both the flap donor leg and the contralateral leg at post-operative weeks 1 and 4. Patients in both cohorts underwent standard chemoprophylaxis discontinued at the time of discharge.

**Results:** All patients were considered high-risk for venous thromboembolism (mean Caprini score 11.6, range 6-18). Free flaps from the anterolateral or anteromedial thigh, fibula, and gracilis were used respectively in 70%, 33%, and 2% of patients. Symptomatic DVT occurred in 7% (4/56) of patients. These manifested as a central-line associated thrombosis, a pulmonary embolism, a proximal DVT in the non-flap leg, and a distal DVT associated with a fibular free flap. Asymptomatic DVT occurred in 60% (6/10) of patients undergoing routine DVT screening. Two DVTs were in the proximal lower extremity and did not appear flap-related (one in the non-flap leg, one chronic DVT). Four DVTs were in the distal lower extremity, three of which occurred in the flap donor leg. Asymptomatic DVTs were treated with therapeutic anti-coagulation consistent with the American College of Chest Physician guidelines.

**Conclusion:** DVT is common in the setting of lower extremity free flaps. Post-operative immobilization and vascular trauma near sites of flap harvest may be important contributing factors. Lower extremity free flap-based reconstruction may warrant routine post-operative screening for DVT in the lower extremities.

### **10:07 AM - 10:11 AM**

Evaluating Perforasome and Clinical Applications of the Superficial Femoral Artery Perforator Flap

Anita Mohan, Rochester, MN, USA

Anita Tanniru Mohan, MRCS, MBBS, BSc; Charalambos K. Rammos; A.T. Laungani, MD;

Gregory James Michalak, PhD; N. Lachman, PhD; M. Saint-Cyr; Mayo Clinic

### **Background**

A reevaluation of the medial thigh as a donor site has identified the superficial femoral artery perforator as a new fasciocutaneous flap for free and pedicled regional flaps for coverage around the knee. The literature on anatomical and perfusion territories for this flap is sparse. This study aims to augment current knowledge on vascular territories and modifications of flap design and harvest, coupled with clinical cases.

## **Materials and Methods**

This study involves anatomical dissection 20 fresh cadaveric lower limb specimens. The direct cutaneous branch from the superficial femoral artery was located between sartorius and gracilis muscles in the medial thigh. Documentation of the perforator location in relation to constant anatomical bony landmarks, diameter, anterograde and retrograde pedicle length and location of cutaneous nerves within the flap territory of the medial thigh were recorded. The anterior skin integument was raised between the mid-lateral thigh and distance of perforator location in relation to the saphenous nerve was recorded. Three-dimensional computer tomographic angiography was used to map perforasome territories for each flap. Clinical cases N= 5, are illustrate some of the potential applications of these flap either as a single or combination reconstructive option, supplemented with SPY Q data analysis.

## **Results**

Preliminary data has shown the average perforasome territory was 100cm<sup>2</sup> and there was a consistent perforator between 5-7.5 cm from the medial condyle, along a line from the medial condyle and the mid-inguinal point. The pedicle length to the origin of the superficial femoral artery was between 7.5-13.5cm. Cutaneous nerves accompanied the main pedicle or within a 3 cm proximity of the main perforator that can be incorporated within the flap.

## **Conclusion**

Anatomical assessment and clinical examples provides a better understanding of the perfusion territories and particular applications of this new flap. The medial thigh can provide loco-regional flap coverage, a good donor site scar, which can be discrete and relatively deficient in hair follicles. The flap can be raised as a free flap or provide pedicled flap coverage around the knee or distal thigh, it has consistent anatomy in terms of perforator location and can be raised with its neurocutaneous supply

## **10:11 AM - 10:15 AM**

Cost Effectiveness Analysis of Neoadjuvant versus Adjuvant Radiotherapy Treatment for Soft Tissue Sarcomas of the Extremities

Duke University Hospital, Durham, NC, USA

Megan Crosmer, MD; William Eward, DVM, MD; Richard Mather III, MD; Howard Levinson, MD; Duke University Hospital

**Introduction:** Soft tissue sarcomas (STS) are rare, malignant soft tissue tumors that commonly affect the extremities. Extremity STS are typically treated with excision and either neoadjuvant or adjuvant radiotherapy. Neoadjuvant and adjuvant radiotherapy provide equivalent outcomes in terms of local control and overall survival; however, neoadjuvant radiotherapy is associated with increased rates of wound complications while adjuvant radiotherapy is associated with increased

risks of fibrosis and lymphedema. The purpose of this study was to compare the cost effectiveness of neoadjuvant versus adjuvant radiotherapy.

**Methods:** A Markov decision model was constructed for a cost utility analysis comparing neoadjuvant to adjuvant radiotherapy for extremity soft tissue sarcoma. Outcome probabilities costs and effectiveness of fibrosis, lymphedema, and wound healing complications were derived from the literature for both neoadjuvant and adjuvant radiotherapy. Effectiveness was expressed in quality adjusted life years (QALYs) gained. Principal outcome measures were average incremental costs and QALYs and net health benefits.

**Results:** Neoadjuvant therapy was more costly but more effective. The cost of treatments for wound complications, lymphedema, and fibrosis were \$11,314 for neoadjuvant therapy (SD \$2074) versus \$8,147 (SD\$536) for adjuvant radiotherapy. Neoadjuvant generated 3.4 QALYs (SD 0.64) versus 3.27 QALYs for adjuvant radiotherapy (SD 0.72). The incremental cost effectiveness ratio was \$24,362/QALY, below the accepted standard of \$50,000/QALY. Therefore neoadjuvant therapy is the preferred strategy with cost effectiveness as the outcome.

**Conclusion:** In patients receiving radiotherapy for extremity STS, neoadjuvant radiotherapy is more costly in terms of treatments for adverse events (wound complications, lymphedema, and fibrosis) than adjuvant radiotherapy. Patients who receive neoadjuvant radiotherapy, however, have improved quality of life as compared to patients receiving adjuvant radiotherapy. The increased quality of life comes at a cost acceptable to society and, therefore, neoadjuvant therapy is the preferred treatment strategy with cost effectiveness as the outcome.

**10:15 AM - 10:21 AM**

**Discussion**

**10:21 AM - 10:25 AM**

Platelet count as a predictor of lower extremity free flap thrombosis: An analysis of 416 cases  
Duke University Medical Center, Durham, NC, USA

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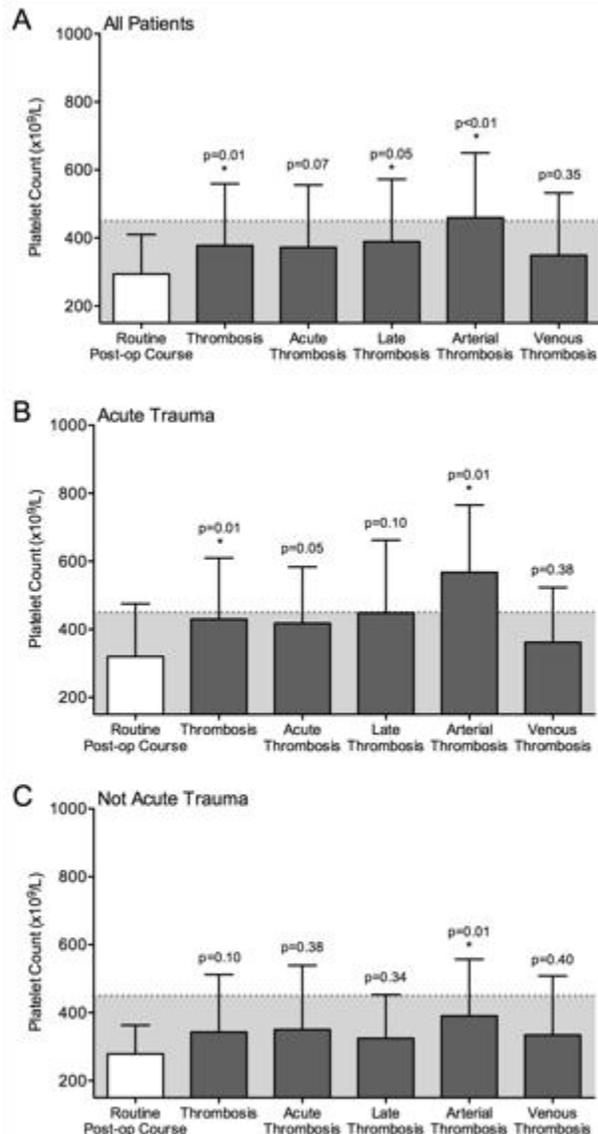
Introduction: Lower extremity free tissue transfer may be complicated by microvascular thrombosis. Particularly in the setting of trauma, inflammation and tissue injury should alert the surgeon to a high risk of failure. In this study, we assess the preoperative and postoperative platelet count as a determinant of flap thrombosis.

Materials and Methods: A retrospective review of all lower extremity free flaps was conducted at Duke University Medical Center between 1996 and 2013. Intraoperative, early postoperative (within 72 hours), and late postoperative (after 72 hours) thrombosis was identified and correlated with preoperative and postoperative platelet counts in addition to flap type, location,

and indication. Univariate and multivariate logistic regression was utilized to identify independent predictors of thrombosis.

Results: 416 flaps were performed over the study period on a total of 402 patients, of which 68% were male with an average age of 42. Thirty percent of patients were smokers, and 36% of the flaps were for acute trauma, of which 38% were latissimus dorsi flaps. Overall flap thrombosis was 15%, with 5% intraoperative thrombosis and 10% postoperative; flap failure rate was 10%. When assessing for differences between flaps with and without thrombotic complications, we found that flaps with postoperative thrombosis had higher preoperative platelet count compared to flaps without thrombosis ( $378 \pm 181 \times 10^9/L$  vs.  $294 \pm 116 \times 10^9/L$ ,  $p=0.01$ ). Flaps with arterial thrombosis had substantially higher preoperative platelet counts ( $460 \pm 190 \times 10^9/L$ ,  $p<0.01$ , figure 1). In multivariate analysis, elevated preoperative platelet count was the strongest independent predictor of postoperative flap thrombosis ( $p<0.001$ ). Furthermore, the optimal cut-off value of preoperative platelet counts in predicting postoperative thrombosis was  $387 \times 10^9/L$ , with a sensitivity and specificity of 43% and 82% ( $OR=2.6$ ), suggesting that patients with platelet counts higher than  $387 \times 10^9/L$  had a three-fold increased risk of postoperative thrombosis compared to those with lower platelet counts. A subgroup analysis for acute trauma patients demonstrated that flaps with thrombotic complications had higher platelet counts than those that did not ( $429 \pm 180 \times 10^9/L$  vs.  $320 \pm 156 \times 10^9/L$ ,  $p=0.01$ ), and an elevated preoperative platelet count was the only independent predictor of postoperative thrombosis.

Conclusions: Utilizing multivariate logistic regression analysis, we demonstrate the importance of thrombocytosis and its relationship to flap thrombosis in reconstructive surgery of the lower extremity. With an expansive array of anti-platelet medications available, strategies to address this problem are being developed.



**Figure 1. Preoperative platelet counts before free flap surgery, according to the occurrence of postoperative thrombotic complications.** (A) All patients (n=416). (B) Acute trauma patients (n=151). (C) Patients who did not suffer acute trauma (n=265). Normal platelet count range =  $150-450 \times 10^9/L$  (shaded in gray). Data expressed as means  $\pm$  SD. Statistical comparisons performed relative to the routine postoperative course.

### **10:25 AM - 10:29 AM**

The versatility of the serratus anterior free flap limb reconstruction: about 130 cases  
Department of plastic and reconstructive surgery, Nantes, , France  
Franck Duteille; Medecine university of Nantes; Pierre Perrot, MD; Nantes University hospital  
The authors report their experience about 130 free serratus anterior free flap for limb reconstruction.

Series : Between 2006 and 2014 130 free serratus anterior free flap were performed for limb reconstruction or to save after trauma. In majority it was male ( 82%). The average age was 39 years( range from 5 to 73 years old). Among this population 10 were children( less than 15 years old) . 94 flaps were realized for acute trauma and the others for chronic wound due to trauma .Location of the loss of substance was : leg( 54%) ; foot or ankle ( 40 %) and upper limb ( 6%). The surface of the defect range from 15 to 432 cm<sup>2</sup>. Flaps who were performed were : muscular or musculo-cutaneous (69%) ; Fascia(11%) ; osteo-muscular with rib ( 17%) or combined with latissimusdorsi ( 3%)

Result : Among the 130 flaps, we have 16 failures( 12%) due to arterial thrombosis in 7 cases and venous thrombosis in 9 cases. For the other patients, with a minimum follow up of one year they were all cicatrized .The other complications were : hematoma( 2 cases), infection ( 2 cases) and pneumothorax ( 4 cases). We did not find any problem of scapula alata

Discussion : In our experience, the serratus free flaps our favorite flap in the management of limb trauma because of his advantages : lack of functional or aesthetic sequelae,- his versatility (fascia/cutaneous/muscle/rib) which allowed to manage a majority of situation- a long pedicle which permit to realize the anastomoses far away from the trauma where the pedicle are always inflammatory- a thickness which allowed the flap to be normally integrated.

### **10:29 AM - 10:33 AM**

The Effectiveness of Free Vascularized Fibular Grafts in Osteonecrosis of the Femoral Head and Neck: A Systematic Review  
University of Pennsylvania, Philadelphia, PA, USA  
Cassandra A. Ligh, MD; Jonas A. Nelson, MD; John P. Fischer, MD; Stephen J. Kovach, MD; L. Scott Levin, MD, FACS; University of Pennsylvania

**Background:** The use of FVFG has been an accepted surgical option to treat ONFHN in an attempt to prevent the conversion to a total hip replacement (THR) yet the majority of studies have been single institution cohorts, with little generalizability. We performed a systematic review examining the effectiveness of FVFG to treat ONFHN, particularly in preventing conversion to THR and improving hip function/symptoms.

**Methods:** We searched Pubmed and EMBASE databases (through 2/14/2014). We developed a search strategy using the following key phrases: femoral head, free fibula, and femoral neck. We reviewed all articles to identify if outcomes were applicable to our study. We focused on Harris hip scores (HHS), THR conversion rates, complication rates and radiographic progression rates. Prior to screening, we excluded papers if they were not translated into English, the n<10 hips, the article was a compilation or review, the outcomes were not relevant, or if the studies were prior to 1994. To address patient overlap from papers originating from the same institution, we included the paper with the largest cohort and excluded those within the same timeline of enrollment. Two investigators independently searched/reviewed articles to determine if they met the pre-determined inclusion criteria. Data obtained included number of patients/hips, average age/follow-up time/ graft survival before THR, HHS (pre and post-operative), THR conversion rate, complications and radiographic progression rates.

**Results:** We identified 128 and 157 papers from Pubmed and EMBASE (Figure). After screening/duplicate removal, 17 studies were included in the final analysis. The majority (76%) of articles were level IV evidence. Articles originated from 11 institutions and 8 countries. When comparing all data, the average number of patients was 123 (range 15-946) and the average number of hips was 159 (range 19-1270). The average age at time of surgery was 33.8 years (range 14-44) and average follow-up time was 94 months (21-216). The average difference in HHS was 20.9 points (4-26.3), the average number of patients that required an eventual THR was 13.7% (3.3-40), the average graft survival time before THR 4.9 years (1-49.9) and the average percentage of hips that showed progression of disease based on radiographic findings were 26% (0-95).

**Conclusions:** There is a significant amount of level IV evidence that describes the role of FVFG to treat ONFHN. While the technique appears to be efficacious based on improved HHS and low conversion to THR, there is still a need for higher level evidence.

**10:33 AM - 10:39 AM**

### **Discussion**

**10:39 AM - 10:43 AM**

The Dorsal Metatarsal Artery Perforator Flap: Vascular Study and Clinical Implications  
Mayo Clinic, Rochester, MN, USA

Nick A. van Alphen, MD; A.T. Laungani, MD; Jodie A. Christner, PhD; Nirusha Lachman, PhD;  
Brian T. Carlsen, MD; Michel Saint-Cyr, MD, FRCS(C); Mayo Clinic

**Background:** Intrinsic flaps based on the dorsal metacarpal arteries are useful for coverage of dorsal hand, finger, and thumb defects. The purpose of this study was to explore the anatomy of the dorsal metatarsal arteries (DMtAs) in the foot to help define their clinical utility. We observed the size and numbers of distal perforators from the DMtAs and

quantified the vascular perfusion pattern of the DMtA perforator across the skin.

**Methods:** Ten fresh cadaver feet were injected with latex and dissected to assess the size and number of distal perforators from the DMtAs. Five DMtA perforator flaps were injected with methylene blue to visualize and quantify the vascular territory of the skin flap to understand the clinical possibilities.

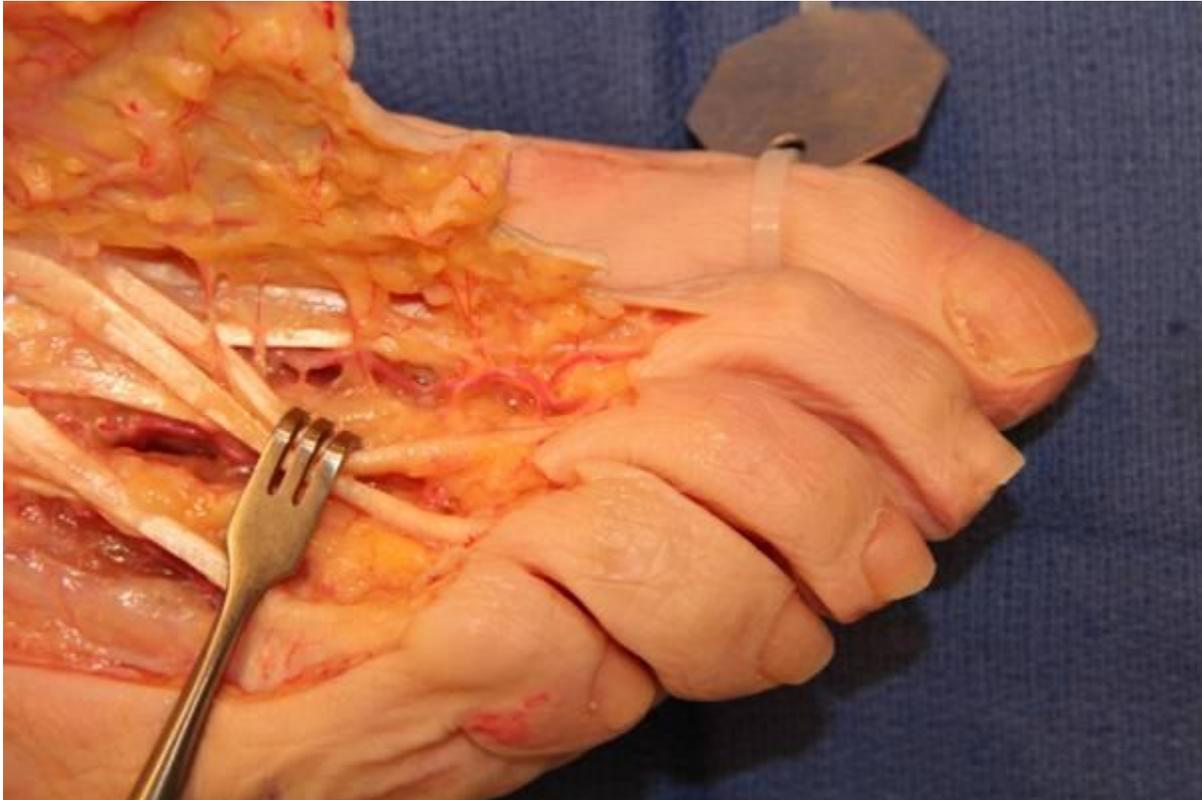


Fig. 1. Latex injection and dissection of second dorsal metatarsal artery (DMtA), showing multiple cutaneous perforators.

**Results:** Ten fresh cadaver feet were dissected (fig 1.). The first DMtA was absent in 2 specimens and the second, third, or fourth DMtA was absent in 1 specimen each. The available DMtAs had between 2 and 5 cutaneous perforators supplying the skin (average, 3.7 perforators per DMtA). The largest perforators to the skin were always seen in the distal half of the DMtA and ranged from 0.4 to 0.8 mm (average, 0.5 mm). Methylene blue injections showed an average flap surface of 21.6 x 47.6 mm.



Fig. 2. Case example of a dorsal defect of the fifth toe (A). The flap was harvested based on distal cutaneous perforators of the fourth dorsal metatarsal artery (B), then rotated and inset into the defect (C), and followed up for 6 weeks (D)

**Conclusions:** This cadaveric study demonstrates the usefulness of the DMtA perforator flap (fig 2). The flap is a valuable addition to the arsenal of flaps to cover the dorsum of the toe, webspace, or defects exposing tendons on the distal dorsum of the foot.

**10:43 AM - 10:47 AM**

The reconstruction of lower extremity soft tissue defects using free flaps: a meta-analysis on recipient-site complications

University of Heidelberg, BG Trauma Center, Ludwigshafen, , Germany

Christoph Hirche, MD; Linyun Xiong; Emre Gazyakan; Thomas Kremer, MD; Ulrich Kneser, MD; Heidelberg University, BG Trauma Center

Background: Free flap transplantation for soft tissue reconstruction in lower extremity has greatly evolved in past decades. However, it is still challenging due to recipient-site

complications. Previously, various recipient-site complication rates have been continually reported with relatively low level of evidences and potential biases. A Meta - analysis of the literature published from 2000 to 2014 in English, Chinese and German was conducted to provide preliminary estimation on its true clinical performances and provide evidences for future clinical practices. Methods: Eligible studies were identified from systematical PubMed and EMBASE searches; data were extracted. A Meta - analysis was performed to generate pooled recipient-site complication rate in aspects of flap loss, hematoma, thrombosis, partial necrosis, early infection and dehiscence. Subgroup analyses were then preformed and publication biases were assessed. Results: Forty-four publications were included. Clinical data of 1152 patients and 1180 flaps were obtained. The pooled complication rates of flap loss, hematoma, thrombosis, partial necrosis, early infection and dehiscence as well as their 95% confidence intervals were 0.02 (0.01 – 0.04), 0.00 (0.00 – 0.01), 0.02 (0.01 – 0.06), 0.04 (0.02 – 0.06), 0.00 (0.00 – 0.01) and 0.01 (0.00 – 0.02), respectively. Relatively higher complication rates have been found in the subgroup analysis of diabetic foot reconstruction basing on 367 flaps. The pooled complication rates of flap loss, hematoma, thrombosis, partial necrosis, early infection and dehiscence as well as their 95% confidence intervals were 0.04(0.01, 0.07), 0.00(0.00, 0.00), 0.04(0.00, 0.11), 0.06(0.03, 0.10), 0.00(0.00, 0.01) and 0.04(0.01, 0.07), respectively. Significant heterogeneities existed among studies. Significant publication bias was found among infection rates. Conclusion: This technique could be valued reliable for the soft tissue reconstruction in lower extremity. Patients with diabetic foot may suffer more recipient-site complications. More well designed studies are needed to provide more evidences in the future. Keywords: Free flap; soft tissue; lower extremity; meta-analysis.

### **10:47 AM - 10:51 AM**

Various Types of Superficial Circumflex Iliac Artery Perforator (SCIP) Flap for Reconstruction of the Extremities: A Single Surgeon's Experience

University of Tokyo Hospital, Tokyo, , Japan

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#### Introduction

Superficial circumflex iliac artery perforator (SCIP) flap was introduced by Koshima in 2004, which overcame shortcomings of groin flaps by dissecting out the superficial circumflex iliac artery (SCIA) further distally and designing the skin paddle lateral to the anterior superior iliac spine (ASIS). This allowed for longer pedicles and thinner flaps. Recently, we have successfully integrated nerves, muscles, bones, and fascia with the skin paddle. These advantages, combined with minimal donor site morbidity, make SCIP flap an ideal option for reconstruction of the extremities.

#### Materials and Methods

From December of 2012 to July of 2014, 12 cases of reconstruction of the extremities were performed by one surgeon (H. Y.) using SCIP flaps. The distribution of the defects were; the

thumbs and fingers in 6, the palm in 1, upper one third of the leg in 1, lower one third including the foot in 4 cases. In 10 cases, only the superficial branch of the SCIA was dissected and used as the pedicle. The sartorius muscle and the deep fascia were integrated with the skin paddle in respective cases, both perfused by the deep branch of the SCIA. For palmar reconstruction, a skin paddle was elevated with the intercostal nerve for sensory recovery.

## Results

In 10 cases, flaps showed complete survival. In one case, postoperative compression of the cast caused epidermal necrosis in a small region. In another case, the flap was removed on postoperative day 10 by the patient, who had previous history of drug abuse. In cases with integrated nerves or fascia, satisfactory functional recovery was observed. There were no complications at the donor sites.

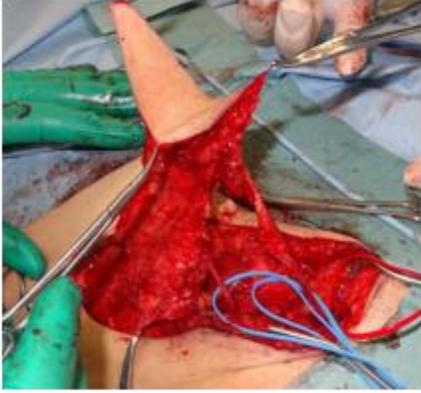
## Conclusions

The advantages of SCIP flaps for extremity reconstructions are as follows:

- 1) When compared with other free flaps, donor site morbidity is minimal; flap elevation does not require muscle or nerve dissection, resulting in no functional sacrifice and shorter operative time. It also leaves an inconspicuous scar, which can be hidden by underwear.
- 2) By designing the flap lateral to the ASIS, a thin flap with a pedicle longer than 10 cm can easily be obtained.
- 3) Vascularized fascia, iliac bone, nerve, or the sartorius muscle can be integrated with the skin paddle, allowing functional reconstruction.

Although dissection and anastomoses of the vessels require special techniques to some extent, SCIP flap has the potential to be a workhorse flap in the near future.





**10:51 AM - 10:57 AM**  
**Discussion**