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Hand Surgery Update II

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Digital Reconstruction with Island Flaps

Guy Foucher and Roger K. Khouri

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Better understanding of the vascular anatomy of the hand and of flap perfusion allows the hand surgeon to perform single-stage reconstruction of digital defects through a multitude of island flap transfers. The usefulness of more than 20 separate island flaps is discussed, and the technique of flap transfer is presented for each.

Reconstruction of the Hand with Forearm Island Flaps

Dominique Martin, Joseph Bakhach, Vincent Casoli, Philippe Pelissier, G. Ciria-Llorens, Roger K. Khouri, and Jacques Baudet

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With the realization that island flaps can survive through retrograde perfusion, the forearm became an important donor site for coverage of the hand. Five different useful flaps can be transferred to the hand based on various axial vessels that course longitudinally along the forearm. The authors discuss the role and usefulness of these flaps and describe for each the surgical technique of flap elevation and transfer.

Microvascular Reconstruction of the Distal Digits by Partial Toe Transfer

Tarek Abdalla El-Gammal and Fu-Chan Wei

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The ideal reconstruction of the distal digits should maintain digital length and provide nail function and sensate glabrous volar pulp. Advances in microsurgical technique have made this possible through a variety of tissue transfers. The foot, especially in the area of the great and second toes, is an excellent source of replacement tissue for distal digital losses. Options for reconstruction use transfer of the contiguous hemipulps of the great and second toes (separately or in combination), great or lesser toenails, great or lesser toe wrap-around flaps, distal trimmed great toe, and partial lesser toes. Several technical refinements have been introduced aiming at simplifying the technique of harvesting and at improving the function and appearance of the reconstructed digits.

Free Flap Coverage of the Hand

David M. Brown, Joseph Upton, and Roger K. Khouri

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Microvascular free tissue transfer has been a major advancement in the treatment of soft-tissue defects of the hand. Free tissue transfers have expanded our options and have altered our approach to hand defects. It is no longer satisfactory to cover hand wounds with unsightly, bulky flaps of tissue. Microsurgical free tissue transfers have given us the tools for more refinement in hand soft-tissue reconstruction and have changed the standards for a successful outcome.

Advances in Peripheral Nerve Repair

Greg P. Watchmaker and Susan E. Mackinnon

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Techniques of peripheral nerve repair are based on our understanding of neural regeneration. The basic tenets of nerve repair, including tension-free repairs using microsurgical technique, continue to hold true. Neural conduits and allografts are showing promise for individuals who have insufficient donor tissue. Advances in our understanding of nerve degeneration and regeneration at the molecular level may soon lead to enhancements in regeneration rate, specificity, and completeness.

New Reconstructive Procedure for Brachial Plexus Injury

Kazuteru Doi

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Reconstruction of prehension, including independent voluntary finger and elbow flexion and extension using double free-muscle and multiple nerve transfers following complete avulsion of the brachial plexus (nerve roots C5 to T1), is presented. The procedure combined free-muscle transfer with reinnervation by the spinal accessory nerve to achieve elbow flexion and finger extension, free-muscle transfer with reinnervation by the fifth and sixth intercostal nerves to restore finger flexion, third and fourth intercostal motor nerve transfer to the triceps brachii to extend and stabilize the elbow, suture of the supraclavicular nerve or the sensory rami of the intercostal nerves to the median nerve to restore hand sensibility, and glenohumeral arthrodesis. This double free muscle transfer technique has restored prehension in patients following complete avulsion of the brachial plexus. This achievement was almost inconceivable as recently as several years ago but now has given these patients new hope of using their otherwise useless limbs.

Advances in Digital Replantation

Michel Merle and Gilles Dautel

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Technical advances in revascularization and in skin cover have resulted in increases in the possibilities of digital replantation. In cases of multiple digital lesions and isolated avulsions of the thumb, all attempts to ensure recovery of basic pinch capacity are justified. On the other hand, in cases of proximal amputation with extensive avulsion or crush injury, such attempts should be abandoned if results on function are important. The surgeon responsible for replantation should weigh the indications after assessing the patient's needs and explaining the advantages and drawbacks of this type of surgery and its results on function.

Management of Severe Ischemia of the Upper Extremity

William C. Pederson

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Ischemia of the upper extremity is unusual, particularly in patients without trauma or iatrogenic injury to the vessels of the arm. Some authors have suggested that ischemia of the upper extremity is one sixth as

common as that in the leg. Management of patients with vascular trauma or iatrogenic injury is usually straightforward, with direct repair or vein grafting of the injured vessel. Patients with ischemia from vascular disease, however, present a different set of management problems. These individuals often suffer from systemic medical problems that lead to their vascular disease, which is often very severe and accelerated because of the underlying cause. This article discusses the approach to these patients and options for management.

Management of Vasospastic Disorders of the Hand

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Stephen J. Troum, Thomas L. Smith, L. Andrew Koman,
and David S. Ruch

Vasospastic disorders of the upper extremity and hand are common. These disorders are characterized by cold intolerance—pain on exposure to cold. A significant amount of pain on exposure to cold is mediated through microvascular mechanisms related to vasospasm or occlusion. This article presents an approach to the diagnosis, classification, and management of vasospastic conditions based on physiologic staging.

Comprehensive Management of Raynaud's Syndrome

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Wyndell H. Merritt

Raynaud's syndrome remains an enigma that suffers from a lack of precise diagnostic criteria, etiologic understanding, or uniformly successful treatment methods. Controversy reigns in almost every aspect of treatment among the three clinical approaches: pharmacologic, surgical, and physical medicine. It behooves clinicians to be aware of the current concepts among each of these three disciplines to coordinate each patient's management and to consider newer approaches for this unsolved problem. This review of current etiologic hypotheses, evaluation methods, and treatment techniques emphasizes the newer microvascular surgical efforts.

Update on Tendon Repair

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John V. Ingari and William C. Pederson

Successful repair of injured tendons—both flexors and extensors—remains one of the ongoing challenges facing the hand surgeon. The latest information on surgical techniques, postoperative rehabilitation, and the role of pharmacologic adjuncts in tendon repair surgery are presented. Pertinent tendon anatomy, physiology of tendon healing, and historical aspects are covered as well. Controversial issues, including indications for repair of partial tendon lacerations and whether or not the tendon sheath should be repaired, are addressed. Illustrated examples of individual tendon repair techniques are included.

Advances in Reconstruction of Digital Joints

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Robert R. Schenck

Advances in reconstruction of digital joints include a precise classification system for severity of injury and application of recent experimental evidence of the value of motion to encourage healing of articular cartilage. The greatest advance, in fact, has been the application of dynamic traction—combining motion and traction—through the use of an arcuate splint to provide ligamentotaxis by distal traction while allowing intermittent passive motion. The dynamic traction splint fabrication and application is fully described, and case examples with excellent long-term results are provided. Dynamic traction can be applied also in combination with either closed or open reduction of fractures, with condylar fractures, or after tenolysis and capsular release. In the future, dynamic traction will be

used even more with continuous passive motion machines. The dynamic traction method is now coming into ascendancy for the treatment of digital joint injuries.

Outcomes Assessment in Hand Surgery: What's New?

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Peter C. Amadio

Outcomes of medical care include many dimensions: physical, social, and emotional function; symptoms; and satisfaction. In many cases, these dimensions can be assessed by patient-completed questionnaires with high reliability, sensitivity, and responsiveness. One such questionnaire—the upper extremity disabilities of arm, shoulder, and hand (DASH)—is reviewed.

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