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Current developments in plastic surgery - An Overview

Abstract

In den letzten Jahren haben Allotransplantationen Eingang in die plastische Wiederherstellungschirurgie gefunden. Sowohl in Österreich als auch im Ausland durchgeführte Handtransplantationen haben gezeigt, dass dabei zwar die immunologischen Abstoßungsreaktionen kontrollierbar, dass aber Sensibilität und Funktion der transplantierten Hand als unvollständig anzusehen sind. Die freie Gesichtstransplantation wird für schwere Deformitäten des Gesichtes nach Verbrennungen diskutiert und steht (vor allem in den USA) kurz vor der klinischen Verwirklichung. Die Distraktionsosteoneogenese hat dabei viele Verfahren der kraniofazialen Chirurgie ersetzt. Mikrochirurgische Zehentransplantationen in Fällen posttraumatischer, fingerloser Hände sind seit vielen Jahren ein erfolgreich angewandtes chirurgisches Verfahren. Die Analyse großer Patientenzahlen hat ergeben, dass nach erfolgreicher Durchführung 93 % der Aktivitäten des täglichen Lebens erfolgreich ausgeführt werden können.Bei der Therapie hypertropher Narben wiederum hat sich ein okklusives Silikontapeverfahren gegenüber anderen okklusiven Narbentherapien behauptet. Die genauen erfolgsbestimmenden Mechanismen sind derzeit jedoch noch immer unklar. Die Anwendung des Nerve-Growth-Factors hat zu einer Verbesserung bei der Behandlung trophischer Ulcera auf der Fußsohle geführt. Die chirurgische End-To-Side-Verbindung von Nerventransplantaten an einen funktionierenden Nerv konnte weitere rekonstruktive Möglichkeiten erschließen.

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Alloplastic tissue transplantation has become a main theme for plastic surgery as well as many other disciplines of modern medicine. New developments in the field of peripheral nerve repair and micro vascular surgery are opening new pathways for reconstructive surgery.

Distraction osteogenesis lengthens and adds bulk to the hypoplastic and malformed mandible but some patients, especially those who have not completely finished growing, may require orthodontic treatment because of post distraction malocclusion.

After a period of consolidation with the application of a multiplanar distraction device and insertion of an autogenous iliac bone graft, bilateral mandibular distraction can begin. During the later phase of activation, angulating the device and applying anterior interdental elastics moulds the mandibular regenerate. This results in rotating the mandibular body and closing the anterior open bite. This technique should be considered especially in patients with mandibular deficiency and anterior open bite. As pointed out, moulding can be achieved both during active distraction and during the consolidation phase (and perhaps beyond). This intervention may also be used in those cases where the mandibular position is not corrected despite all efforts. The time parameters for successful moulding remain to be defined.

Face Transplantation: Where Do We Stand?

Composite tissue allotransplantation has extended the boundaries of reconstructive surgery to include patients with tissue defects that cannot be adequately treated with techniques using autologous tissues. Some plastic surgeons have suggested that face transplantation might be the next step. Here we look at the current scientific status regarding the prospect of face transplantation, and the reasons why human face transplantation could or could not be performed.

The main surgical concerns are vascular reliability of the facial “flap” harvested from a brain-dead donor, donor-host tissue discrepancy, and nerve regeneration across the transplanted face. Any compromise in vascularity could lead to large necrosis of the transplanted face. Technical obstacles and uncertainty about the functional and aesthetic results must be carefully weighed up before face transplantation is undertaken. Long-term graft survival would depend upon adequate immunosuppression being continued for an indefinite period of time. Chronic rejection would also be a serious threat to long-term functional outcome.

Face transplantation should be considered as a potential medical solution for a small number of patients with serious physical distortions or functional disabilities, but even in such cases the uncertain benefits are not enough to justify the procedure. No attempt at face transplantation should be considered without more experimental studies and discussions within the plastic surgery community.

Human Hand Allograft: First 6 Months Report

Hand transplantation is possible, and rejection episodes can be managed, but sensation and functional analysis are not complete.

Toe-to-Finger Transfer (TFT) for Post-traumatic Reconstruction of the Fingerless Hand

Free toe transfers have become widely accepted for reconstruction of a missing thumb. Similarly good results have been reported with the transfer of multiple toes to reconstruct 2 or more fingers, yet many surgeons hesitate to use this procedure.

Six patients were available for follow-up at an average of 45 months. They had a range of motion of 10º at the distal interphalangeal joint, 18° at the proximal interphalangeal joint, and 59° at the metacarpophalangeal joint. All hands had protective sensation. Compared with the grip strength and key pinch strength of the opposite hand, the grip strength of the reconstructed hand was 26% and the key pinch strength was 70%. Patients were able to perform basic activities such as writing, turning pages and picking up small objects, although performance was slow. All patients went back to work and they were able to perform 93% of

daily activities without assistance. They reported only mild hand and foot symptoms, although two thirds were conscious about the appearance of the reconstructed hand. Overall patient satisfaction rates were very high.

This experience supports the use of TFT in reconstruction of fingerless hands. Although functioning is not as good as with normal fingers, the reconstructed hand offers good function, sensation and adaptability. The functional benefits of TFT reconstruction outweigh the cosmetic problems. Patient satisfaction is excellent.

Silicone Occlusive Treatment of Hypertrophic Scar

Silicone gel sheeting is often used to minimise hypertrophic scar formation at sites of healed cutaneous injury. Despite extensive experience with adhesive silicone gel, we know little about how it works on hypertrophic scars.

The epidermis of wounds covered with silicone gel, however, had few vesicles and a more distinct (although irregular) basal lamina, which more closely resembled that found in unwounded skin. The water vapour transmission rates of the silicone gel and Op Site occlusive dressings were similar. Adhesive silicone gel was more effective than other common nonsilicone occlusive dressings in the prevention of hypertrohpic scars secondary to trauma. Exactly how silicone gel exerts this effect remains unknown, but the similar water vapour transmission rates for silicone gel and a nonsilicone dressing effectively rules out scar hydration as its sole mechanism of action. The findings of transmission electron microscopy suggest that epidermal signalling from immature epithelium may be an important cause of hypertrophic scarring.

Immediate Hair Transplantation into a Newly Closed Wound to Conceal the Final Scar on the Hair-Bearing Skin

When a surgical wound is made in hair-bearing skin, the resultant scar creates a linear hairless area. To prevent this appearance, hair minigrafts or micrografts can be inserted into the edges of the wound just after closure. Transplanting hair to a linear wound closure site immediately has the advantages of not requiring a second operation and providing a more favourable site for the hair grafts than can be obtained in a latter procedure. Disadvantages include the possibility of ingrown hairs or cyst formation and longer time required for the wound to gain tensile strength. A closure that is free of tension is essential to obtain a good result with this technique.

Topical Treatment of Pressure Ulcers with Nerve Growth Factor

Pressure ulcers of the foot are a major cause of morbidity in older persons and the most important health care challenge in nursing home residents. A pressure sore dramatically raises the cost of medical and nursing care. Standard management includes local wound care and surgical repair. The topical application of growth factors is a new treatment option.

The topical application of nerve growth factor may be effective in the treatment of patients with severe pressure ulcers of the foot. The combined findings that keratocytes and fibroblasts produce nerve growth factor accelerates wound healing in mouse skin are consistent with the hypothesis that nerve growth factor may have an explicit effect on the epithelium and is implicated in functional activity in wound healing.

End-to-Side Neurorrhaphy of Motor Nerves: Reinnervation of Free Muscle Transplants – First Clinical Application

Surgical reconstruction of the use of long nerve grafts through proximal nerve repair is not often clinically satisfactory. End-to-side suture of the nerve of a free muscle transplant to an uninjured nerve in the area or to a reconstructed nerve may provide a practical solution in some cases, such as avulsion injuries when no proximal nerve stump or nerve transfer is available for direct end-to-side nerve suture or in cases in which it is necessary for the regenerating axons to overcome extremely long distances, and limited functional results are expected.

It appears that good and clinically significant reinnervation of a functional muscle graft can be accomplished through an end-to-side nerve suture. In a comment, Evans noted that the reinnervation of free muscle transfers is a sign of progress that provides several major advantages over end-to-end anastomosis, including the avoidance of any functional loss in the muscle supplied by the donor nerve, avoidance of long nerve grafts, and the possibility of introducing a free muscle where the proximal nerve supply is missed.

Silicon Assays in Women With and Without Silicone Gel Breast Implants: A Review

Background. – Silicone breast implant failures have led to an interest in measuring silicone in blood, serum, breast milk, and tissues. Although there is no method for measuring silicone, electrothermal atomic absorption spectrometry, direct-current plasma emission spectrometry, and inductively coupled plasma atomic emission spectroscopy have been used successfully for measuring the element silicon, which is part of silicone.

Results. – With the above methods, it has been found that silicon levels in plasma, serum, and blood of control women without breast implants range from 10 to 250 ng/ml. Studies of similar silicon levels in women with breast implants have shown variable results compared with those in control women. Although breast milk silicon levels are similar for women with and without breast implants, the average silicon level in shop-bought cow's milk is significantly higher than that in infant formula. Although baseline silicon levels in control patients vary dramatically from study to study, studies in women with silicone gel implants show elevated levels of silicon in the capsules compared with control breast tissue. Silicone bleed rates vary from 100 to 220 mg/y and increases with time as capsule barrier layers lose effectiveness.

Tissue silicon levels are lower for saline implants than for silicone gel implants, but are elevated nonetheless. A connection between silicon levels and connective tissue disease has not been established. Silicon levels in hemodialysis patients are 15 to 20 times the level in normal individuals and appear to be linked to diet. Because silicon is the second most abundant element on earth and can be inhaled as silica, considerable variation in assay results among individuals is expected. Silicon is an important component of connective tissue, bone formation, and calcification. Although its levels in tissue are known to decline with age, elevated levels of silicone have been found in the brain of patients with Alzheimer's disease.

Conclusion

There is no generally accepted clinical role assay for measurement of silicon in blood, serum, breast milk, or tissues.

The above-depicted new trends and perceptions in the field of plastic surgery were compiled from the 2004 and 2005 annuals for plastic and reconstructive surgery.