



Karolinska University Hospital

Department of Reconstructive Plastic Surgery



Photo: Veijo Mehtonen, Medicinsk Bild

Reconstructive Plastic Surgery – Beneficial to Many Patients

The Department of Reconstructive Plastic Surgery was founded in the 1940s at Karolinska University Hospital in Solna. Our department is the only one of its kind in Stockholm County, and the largest in Sweden. Reconstructive plastic surgery involves creating or restoring form and function to give patients the best possible quality of life. We specialize in surgical treatment of congenital deformities, immediate or secondary reconstruction in cancer patients, and reconstruction after various types of trauma. The demand for reconstructive plastic surgery is high. Well-defined indications for surgery are essential to assure appropriate and equitable care.

Our vision: To create form and function through science and care.

Our mission: To offer high-quality reconstructive plastic surgery and effective care to our patients and to actively share knowledge about reconstructive surgery with students, referrals sources, and the public.

Reconstructive plastic surgery is a uniquely broad field. We operate on every age group and on all areas of the body. Hence, we offer treatments that require high standards of practice by everyone in our organization.

Much of our work takes place outside our own department through multidisciplinary collaboration. Although most of our visits are scheduled, we provide care for patients around-the-clock, treating mainly burns, facial injuries, and extensive soft-tissue infections.

Our department includes a surgical operating and recovery unit (open 7 days/week), an ambulatory care unit with outpatient surgery, and a Burn Centre.

The Department of Reconstructive Plastic Surgery is divided into five sections focusing on clinical care, as well as on research and development:

- Craniofacial Section
- Microsurgery Section
- Breast Surgery Section
- Burn Care Section
- Other Subspecialities in Plastic Surgery

The department provides nearly 2000 operations annually, whereof over 1400 are inpatient surgery, and the remainder are outpatient procedures. We have around 15 000 outpatient visits per year. In addition, we offer extensive paediatric services at the Astrid Lindgren Childrens Hospital and the Burn Centre. The department has approximately 140 full time employees, including 25 plastic surgeons.

For large patient groups, specially trained contact nurses follow the patients to assure quality throughout the entire continuum of care.

A structured training programme is used to educate new caregivers and future plastic surgeons.

The department is involved in extensive national and international collaboration with other providers to enhance the quality of care for small and highly specialized patient groups.

Our department is environmentally certified (ISO 14001), as is Karolinska University Hospital in general.

Craniofacial Section

– Facial Reconstructive Surgery

The Craniofacial Section treats patients with facial trauma (injury), craniofacial (skull and face) deformity, microtia (external ear deformity), facial paralysis, and vascular malformations. Patients, parents, and the treatment team all have high expectations on the aesthetic and functional outcome of treatment.

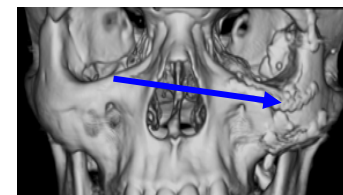
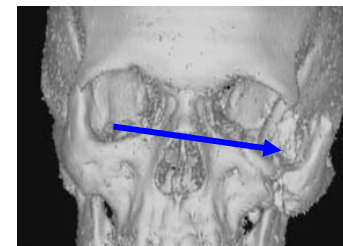
Facial Trauma

Traffic accidents, physical abuse, and sports injuries are common causes of facial trauma. The surgical procedures are performed in collaboration with ear, nose, and throat (ENT) surgeons, maxillofacial surgeons, and neurosurgeons on the facial trauma team. The team also includes radiologists and eye surgeons from the St. Erik Eye Hospital in Stockholm.

Annually, Karolinska University Hospital in Solna provides surgery for about 100 patients with facial fractures, whereof 40 are treated at the Department of Reconstructive Plastic Surgery.

Fractures of the zygomatic bone (cheekbone) are most common. In most cases these fractures are treated by fixation with titanium plates and screws (Photos 1 and 2). Fractures of the orbit (eye socket) are also common.

*Zygomatic fracture (left side),
before and after surgery*



Craniofacial Deformities

A craniofacial team including plastic surgeons, orthodontists, and speech therapists treat patients with skull and facial deformities. Several other specialists are also associated with the team. Lip, palate, and jaw defects are the most common problems. Annually, around 180 children with such defects are born in Sweden, whereof about 50 are born in Stockholm. These children undergo lip surgery at 4 to 5 months of age, palate surgery at 12 to 15 months of age, and bone transplantation from the hip to jaw at 10 to 12 years of age. A team monitors the children regularly until they reach 19 years of age. The team also treats children with other uncommon facial defects. Care is delivered in accordance with clinical protocols, but individualized in most cases. Treatment options include distraction (transplanting rib bone to the lower jaw/jaw joint, transplanting scalp bone to reconstruct the cheekbone, and surgery to adjust the jaw). Maxillofacial surgeons, neurosurgeons, and eye surgeons often collaborate in these procedures.



Photo 1. Unilateral cleft lip/palate

Photo 2. Isolated cleft palate

Photo 3. Bilateral cleft lip/palate



Photos 4 & 5. Before and after lip and nose surgery

Facial Paralysis

Unilateral facial paralysis is caused by damage to the large facial nerve (*nervus facialis*), e.g. resulting from trauma, infection, surgery, or no apparent factor. If the facial muscles become fully or partly paralyzed, the face becomes asymmetrical. Paralysis can lead to sores in the eye due to dryness, since the eye cannot be closed completely. Patients may have difficulty speaking clearly or keeping food and saliva in the mouth. Their ability to smile naturally disappears, and facial movements appear unnatural.

Several different types of surgery are required to reconstruct all functions and obtain a result that is aesthetically pleasing. For example, eye problems can be treated by inserting gold weights in the eyelid to help close the eye, a tendon “sling” attached to the temporal bone can keep the mouth from sagging, and several other advanced corrections, such as shortening the mid-facial muscles, might be needed to improve the patient’s life.

The most advanced methods involve nerve grafts and muscle transfers to the face, which are the only procedures that can partially restore facial expression (see Microsurgery Section).

Vascular Malformation

Patients (paediatric and adult) with vascular malformations comprise a group of patients with very diverse and rare conditions. To care for these patients in the best possible way, a team of specialists focuses on the diagnosis, investigation, and treatment of these disorders. Patients are referred from near and far, and the teamwork of this group is unique in Sweden.

Treatment strategies may include surgery, laser therapy, medication, and combinations of these methods. The team is engaged in an active dialogue with international contact groups.

Microtia

Microtia means, “little ear”, but the term covers all grades of external ear deformities. This is a rare condition, affecting about 20 newborn children per year in Sweden.

Reconstructing an external ear is a challenge in reconstructive surgery since ear cartilage is thin, soft, and complex in form. The aim of surgery is mainly cosmetic, and it does not improve hearing.

Three of the deformities that can be surgically corrected are shown below:

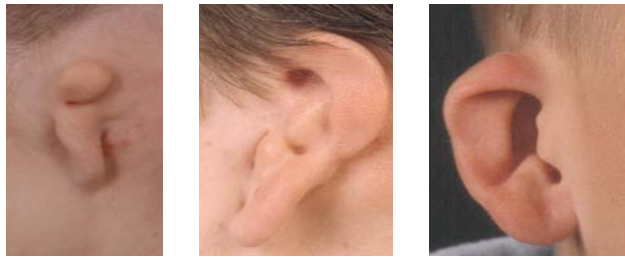


Photo 1. Microtia – lobular type

Photo 2. Microtia – conchal type

Photo 3. Pronounced case of cup ear

Reconstruction of the external ear can be considered only after the child has reached ten years of age. At that age, sufficient rib-graft cartilage is available to form a new, three-dimensional ear. Rib cartilage is stiffer, which means the new ear is not as flexible as a normal ear, but it looks similar to a normal ear. Surgery involves a two-step procedure. In the first operation, rib cartilage is removed and sculpted into an ear shaped as similar as possible to the developed ear. The cartilage is placed beneath the skin at the site of the new ear. During the second operation, about six months later, the skin groove behind the ear is created.

Before and after an ear reconstruction



Microsurgery Section – Connecting Vessels and Nerves

Modern microscopes, which greatly magnify images, now enable surgeons to connect vessels and nerves that are only a millimetre in diameter. Special instruments and sutures are used to connect veins and nerves. The method has revolutionized reconstructive surgery since surgeons can move tissues to different sites in the body. The Microsurgery Section includes five specialized areas as described below.

Breast Reconstruction Using the Body's Own Tissue

The most common microsurgical reconstruction is performed after total mastectomy for breast cancer. The patient's own abdominal tissue is used to construct the new breast in a way that approximates the form and consistency of the other breast. The department is planning a new method of microsurgical breast reconstruction, using tissue from the thigh to construct a new breast. This is being done in collaboration with the university hospital in Innsbruck, Austria.



Microsurgical breast reconstruction using the DIEP flap method (tissue from the abdomen).

Reconstruction in the Head and Neck Region

A major area of activity involves reconstruction after cancer, mainly in the mouth and throat. Starting in the 1980s, the department became an early leader in this advanced type of surgery. Each patient receives a multidisciplinary evaluation, and treatment is individually designed with consideration to the individual's ability to speak, eat, etc following surgery. Tissues from the forearm, lower leg, or back can be used for reconstruction.

Microsurgery for Facial Paresis – For an Expressive Face

Microsurgery for facial paralysis is a two-step procedure. First, nerves are transplanted from the lower leg to the face. At least a six-month interval is necessary before the second surgery. Then a muscle, with its nerve, is connected to the transplanted nerve. In this way the patient regains part of the muscle function in the half of the face that had been paralyzed, and it becomes easier to chew, speak, and smile again.

Reconstruction for Soft-tissue and Skeletal Injuries

Cancer surgery in the skeleton or soft tissues, and major trauma, e.g. traffic accidents, can leave major tissue defects that require replacement with new tissue. The lower leg is a vulnerable area where complex bone fractures and major soft tissue injuries require tissue from other areas of the body.

Neurosurgical Reconstruction

Neurosurgery is another area where microsurgery may be necessary, and where cancer surgery can leave major defects in the scalp that must be covered. Here, the methods for coverage vary depending on the appearance of the defect.

In summary, microsurgical transplantation of tissue represents one of the major advances in plastic surgery, requiring highly specialized skills. Techniques are being refined constantly, and reconstructions usually have very favourable results that improve the lives of our patients.

Breast Surgery Section

– Reconstructing a Normal Breast

Reconstructive breast surgery aims at correcting and normalizing a condition that is debilitating for the patient. Achieving a good result requires the close collaboration of patients, surgeons, and other caregivers. It is always the patient's experience that determines whether or not an operation is successful.

Breast Reconstruction – A New Breast

For a woman, breast reconstruction after a mastectomy (breast removal) means that she can return to a normal life and feel whole again. A new breast can be created concurrently with removal of a tumour– **primary reconstruction** – or at a later date when cancer treatment, e.g. radiation therapy and chemotherapy, has been completed – **secondary reconstruction**.

Primary reconstruction usually involves placing an expandable prosthesis beneath the breast muscles and filling it successively with saline solution until the reconstructed breast looks similar to the other. A special type of primary reconstruction is performed in patients at high risk for developing cancer later in life. Here, breast tissue is removed as a preventive measure, **prophylactic mastectomy**.

In secondary reconstruction, a new breast is formed using either an expandable prosthesis or a combination of prosthesis and the patient's own tissues (skin/fat/muscle), e.g. moved from the back or flank. In some cases, the breast is created exclusively from the body's own tissue. No reconstructive method is clearly superior to others, and the choice of method is determined jointly by the patient and surgeon, considering factors such as body composition, previous radiation of the chest, scarring, the scope of the surgery, and above all, the patient's preference.

Breast Reduction

Patients who suffer from excessively large, heavy breasts that interfere with daily activities and social life can have their breasts surgically reduced. Breast reduction is a common procedure, the surgical technique is well established, and the indications for surgery are based on national guidelines.

Other Breast Reconstructive Surgery

We also treat patients with substantial differences in breast size and form (breast asymmetry), total loss of breast tissue (breast aplasia), or other breast deformities. The conditions may be due to a malformation syndrome or occur in patients with chromosomal abnormalities. These women are often young, and surgery may play a major role in their social development.

Male patients with abnormally large mammary glands (gynecomastia) can be treated with reconstructive breast surgery. Breast enlargement can occur, e.g. in conjunction with hormone therapy for prostate cancer, can be painful, and is usually a source of distress for the patient. Surgery involves removing glandular tissue and restoring the normal male appearance.



Photo 1. Mastectomy patient.

Photo 2. Patient with reconstructed breast with prosthesis on right side, and concurrent breast reduction on left side.

Photo 3. Patient with breast reconstructed from abdominal tissue.

Burn Care Section

– Treating the Most Severely Injured

Karolinska University Hospital's specialized Burn Centre, inaugurated in 2004, complies with high international standards for burn care. Structured collaboration between the intensive care unit and the Burn Centre aims to assure a high level of care and safety. The surgical team comes to the patient at our centre's well-equipped operating theatre, and patients are cared for in single rooms to minimize the risk for infection.

The centre is also a resource for patients with major soft-tissue damage from trauma, advanced sores from impaired blood circulation, major soft-tissue infections, and life-threatening allergic reactions that break down the skin, causing damage similar to a major burn.

Annually, about 110 adults and 70 children with burns receive care at the Karolinska University Hospital and the Astrid Lindgren Children's Hospital.

Burn Centre at Karolinska – Team Care

Burn patients are treated by teams of highly qualified specialists, including plastic surgeons, intensive care nurses, assistant nurses with special expertise in wound care, intensive care physicians, paediatric surgeons, paediatric nurses, infectious disease specialists, occupational therapists, physiotherapists, social workers, and dieticians.

In addition to specialized burn care, the Karolinska also offers HBO (hyperbaric oxygen) therapy and is Sweden's only provider of ECMO (extra corporeal membrane oxygenation). HBO reduces the risk for brain damage in burn patients suffering from severe smoke inhalation and carbon monoxide poisoning. ECMO is used to treat patients with respiratory and/or circulatory failure when traditional intensive care proves insufficient. ECMO can save the lives of severely burned patients with lung damage.



Operating theatre



Hand therapy

Reconstruction of Burn Injuries

After the hospitalization phase, burn patients receive care for their injuries at special outpatient burn clinics and from occupational therapists. In some cases, further operations are needed, where techniques in plastic surgery are used to restore the best possible form and function. Treatment options include skin transplantation (grafting) through skin expansion, or microsurgery.

Rehabilitation

With financial support from the National Board of Health and Welfare, a Centre of Excellence for the rehabilitation of patients with functional impairments, activity limitations, and disabilities following severe burns has been established at the Department of Rehabilitation Medicine.

Education

Since year 2000, the Burn Centre has arranged annual courses in advanced burn life support (ABLS). The American College of Surgeons (ACS) and the American Burn Association (ABA) accredit these courses. The courses mainly target physicians and nurses, and are open to participants from throughout Sweden.

The unit plays an advisory role for other providers, and participates in college and university educational programmes on burn injuries.

Other Subspecialities in Plastic Surgery

Surgery for Skin Cancer

We care for patients with malignant melanoma, squamous cell carcinoma, or other skin cancers, primarily involving the face. Skin cancer is treated by removing the tumour and often requires special skin replacement methods. Treatment for melanoma is highly specialized and carried out in collaboration with the Department of Dermatology and the Department of Oncology (Radiumhemmet). A relatively new treatment method called sentinel node surgery involves removing one or more sentinel nodes (lymph nodes) to map the disease and plan further care. These services are delivered in collaboration with the Department of Nuclear Medicine and the Breast Centre.



Squamous Cell Carcinoma



Malignant Melanoma

Pressure Ulcers

Patients with spinal cord injury or disorders that impair mobility and sensation, e.g. multiple sclerosis, have an elevated risk to develop pressure ulcers. Living with pressure ulcers is socially debilitating and disrupts normal, daily activities. At the Department of Reconstructive Plastic Surgery we operate on ulcers that do not heal within a reasonable time, despite good wound care. For several years, our department has collaborated with the Spinal Cord Injury Department, which provides outpatient care, and with Rehab Station Stockholm that serves patients during the important mobilization and rehabilitation phases after surgery. Care for pressure ulcers in Stockholm County is structured around a special clinical protocol. An essential component is the extensive patient information aimed at avoiding the appearance of new ulcers.

The three units work in close collaboration, and we can offer our patients a continuum of care with a high level of care and expertise. In

Gender Reassignment Surgery

The Department of Reconstructive Plastic Surgery has offered gender reassignment or transsexual surgery for several decades. We now share this responsibility with Linköping University Hospital. The number of patients diagnosed as transsexual has increased rapidly in recent years, and we currently operate on about 20 new patients per year at our department. Apart from the initial major surgical procedure, we also perform several complementary operations. Patients need to be in close and frequent contact with the treatment team. The team works in close collaboration with other specialities, e.g. psychiatry, endocrinology, gynaecology, and phoniatics.



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