

IN-BODY SPARE PARTS

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The replacement of damaged or missed parts of human body with those of other parts of the same body should be the first choice in surgical practice. It is important to know that transplanting parts of the same body will not have rejection reaction or infection as it is if we substitute parts with synthetic material or those from another human or animal. Also it does not require drugs to decrease immunity so it is safe, cheap and time sparing. Although the autograft has its restrictions, including donor site morbidity and small size limitations, it may still be the golden procedure. Here are some examples in different branches of surgery.

Urosurgery

Ureter:

* Use of Ileum as Ureteral Replacement: the use of ileal segments for ureteral substitution has become a valuable procedure in reconstructive urology. Although it was initially described for tubercular obstruction, recent decades have seen the indications for its use broadens. It is a better alternative than nephrectomy in cases of complex and multiple ureteral strictures¹.

* Long ureteric stricture replacement by buccal mucosa graft seems to be better option as it avoids complications associated with bowel interposition. Thick elastin-rich, hairless epithelium of buccal mucosa makes it more resistant to infections and sclerosing conditions. In addition, the healing of the donor site is fast and is associated with low morbidity and complications. Thin but highly vasculature lamina propria of the graft plus an abundant vasculature bed (wrapped omentum) provide ideal take-up conditions for the graft².

* Appendix Interposition of the Ureter; Under specific circumstances the appendix vermiformis may be an suitable organ for plastic repair of a large ureteral defect which can be bridged effectively with the appendix as it is an acceptable alternate for all segments of both ureters^{3,4}.

Urethra:

* skin for hypospadias and urethral stricture repair^{5,6}.

* Long-term outcome of ventral buccal mucosa can be used as onlay graft urethroplasty for urethral stricture repair. It is currently one of the best treatment modalities as it provides stable long-term results with complications occurring primarily during the first 12 postoperative months. A buccal mucosa graft placed dorsally or ventrally remains an excellent graft material in the bulbar and pendulous urethra⁷.

* Appendix can be used in the treatment of severe posterior urethral injuries: segment of appendix with its intact vascular pedicle is meticulously mobilized and anastomosed to the proximal and distal site of the urethra⁸.

Also in recurrent urethral stricture, pedicled appendix graft can be used. Through a perineal-transpubic approach the stricture tissue was excised, which resulted in a gap of 5 to 7 cm between the healthy ends. The vermiform appendix was mobilized on its own pedicle and transposed to the perineum; the proximal end of appendix was anastomosed to the prostatic urethra and the distal end (tip discarded) to the bulbar/penile urethra⁹.

Bladder:

Augmentation of the bladder can be carried out using gastric, small or large bowel segments¹⁰.

Gastrointestinal surgery

Esophagus: Can be substituted with part of stomach, jejunum, colon, or skin tube¹¹.

Stomach can be substituted with jejunum in cases of partial or total gastrectomy¹².

Bile ducts: Can be replaced by femoral vein¹³.

Anal sphincter: Repair can be done by gracilis muscle or gluteus maximus¹⁴.

Orthopedics and fracture

Bone grafts: A necessary treatment tool in the field of acute and reconstructive traumatic orthopedic surgery. They are obtainable in form of cancellous, cortical, or bone marrow aspirate. Autogenous bone graft is considered as typical mean in managing post-traumatic conditions such as fracture, delayed union, and nonunion¹⁵.

Segmental cortical autogenous grafts are used to reconstruct bone defects such as fibula bone¹⁶.

Tendon graft: such as the use of palmaris longus tendon in grafting extensor pollicis longus tendon¹⁷.

Nerve graft: A segment of unrelated nerve is used to substitute or overpass an injured portion of nerve, such as utilizing a small part of sural nerve in nerve graft¹⁸.

Plastic and facio-maxillary surgery

Skin: graft or flap, used to cover exposed areas due to skin loss, burn, and tumor removal. The advantages of using auto skin grafts are: they have little or no rejection reactions with good tissue compatibility, are nontoxic, permeable to water vapor just like normal skin. Microorganisms cannot penetrate it, and there is rapid and persistent adherence to a wound surface. Also such skin grafts are suitable for ingrowth of fibrovascular tissue from the wound bed, and are malleable to irregular surface, allow motion, and resist linear and shear stresses¹⁹.

Iliac crest, costal cartilage and ribs are used in rhinoplasty craniofacial reconstruction and facial trauma^{20,21}.

Ophthalmic surgery

Fascia lata can be used for ptosis operation and also conjunctival graft or amniotic membrane for pterygium surgery^{22,23}.

Anesthesiology

Blood can be used for treatment of post-spinal headache due to CSF dural leak by blood patch procedures from the patient's own blood²⁴.

Stem cells

Stem cells help to eliminate the cause of disorders leading to a reduction in symptoms or a full recovery, depending on the initial condition, for (mostly) autoimmune disorders and/or diseases associated with tissue damage.

There is a large percentage of cases with a variety of diseases that have experienced health improvements. Applying only stem cells for some cases may be not enough. Cell therapy works more effectively when combined with other therapeutic methods that help decrease inflammation, restore mobility, and activate the tissue repair process.

We've seen various levels of recovery after treating the following diseases (not a full list)^{25,26}:

Neurological disorders

- Multiple Sclerosis
- Parkinson's disease
- Dementia
- Alzheimer's disease
- Post-stroke condition
- Injuries of CNS
- Lyme disease

Endocrine diseases

- Diabetes type 2
- Diabetic foot
- Erectile dysfunction
- Obesity

Musculoskeletal disorders

- Arthritis
- Osteoarthritis
- Sports-related injuries complications
- Athletic performance improvement

Digestive System Diseases

- Crohn's disease
- Cirrhosis of the liver
- Peptic ulcer disease
- Chronic pancreatitis

Respiratory diseases

- COPD
- Asthma
- Allergic rhinitis
- Sarcoidosis

Rheumatic diseases

- Systemic scleroderma
- Dermatomyositis
- Rheumatoid arthritis
- Lupus
- Vasculitides

The capability of stem cells to repair and regenerate new tissues and organs grasp a great promise for dealing with many serious diseases and injuries.

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