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**FACT SHEET**

**Technical details of the transplant**

The entire penis was carefully dissected from the donor to keep blood vessels, nerves and other connecting structures intact. These were marked and connected to the recipient’s correlating tissue during the transplant.

It is a complex procedure known as a composite tissue transplant, during which different types of tissue (nerves, blood vessels, muscle etc.) are cross-connected between the recipient and the donor organ.

The surgeons connected three blood vessels (each between 1 and 2 mm in diameter) to ensure sufficient blood flow to the transplanted organ; two dorsal nerves (also between 1 and 2 mm in diameter) to restore sensation; the urethra, which enables the recipient to urinate through the penis; as well as the *corpus cavernosum* (cavernous body of the penis), which will allow the patient to obtain an erection.

“The diverse presentation of the blood vessels and nerves makes the operation very challenging and means each case is unique. All these structures need to be treated with the utmost delicacy and respect in order to be connected perfectly to ensure good circulation and function in the long term,” says Zühlke.

Micro-surgery was used to connect small blood vessels and nerves. The patient has since returned for a minor procedure to remove a small piece of dead tissue on the skin edges.

**Immunosuppression**

Through a process called an immune response, the body naturally rejects any foreign object inserted into or attached to it. During an organ transplant, this immune response has to be suppressed to prevent the body from rejecting the transplanted organ. An immune response can only be avoided in cases where the patient’s own tissue, or that of an identical twin, is used.

“Transplants where several types of tissue are involved (muscles, nerves, blood vessels, etc.) require stronger immunosuppression treatment than transplants of organs involving fewer cells, such as kidneys,” explains Moosa.

The immunosuppression medication used during penis transplants, although not usually used as a first-line treatment, is available in state facilities and is generally used after kidney transplants.

Although the dosage is reduced as time goes on, transplant patients have to take immunosuppression medication for the rest of their lives – even if they have made a full recovery.

**Ethical considerations**

Permission for the study was granted by SU’s Health Research Ethics Committee (HREC) in 2011 and the transplant team has been in close consultation with ethicists and the HREC throughout the design and conduct of the study.

According to Dr Nicola Barsdorf, Head of Health Research Ethics at the FMHS, the research team adequately addressed the important ethical issue of therapeutic misconception (the risk that a research participant may not fully understand that this treatment is only experimental).

“The patient was repeatedly counselled over an extended period of time about the potential benefits and risks of the procedure. He had a clear understanding about the experimental nature of the transplant and provided his informed consent after multiple, comprehensive discussions about the voluntary nature of his participation,” explains Barsdorf.

According to Barsdorf, careful consideration during the planning phase of the study allowed them to anticipate potential pitfalls, including:

* Therapeutic misconception refers to a participant’s failure to fully understand the difference between research and treatment. It can include an overestimation of clinical benefit from an experimental intervention, as well as underestimation of potential risk of harm. To minimise the risk of therapeutic misconception the research team implemented a rigorous informed consent process. The recipient was counselled over a period of two years, during which his understanding of the risks involved were assessed and truly informed and voluntary consent to the experimental procedure was promoted.
* The ethicist’s inputs spelled out risk mitigation steps for the emotional, social, psychological (as well as physical) risks that research participants might experience. The recipient was selected based on these inputs. A number of participants were eligible for scientific reasons, but at substantially higher risk of physical and psychological harm.

**Psychological aspects**

All patients considered for the study have to undergo extensive psychological evaluation to determine whether they are mentally fit to receive a transplant. Organ transplantation could have a negative psychological effect if patients can’t associate with the organ.

**Medical tattooing**

Advancements in technology have expanded the age old custom of tattooing for medical purposes. Micro-dermal pigmentation is currently used to improve the appearance of individuals with medically-related physical imperfections.

Nipple and areola reconstruction by means of tattooing after a mastectomy is probably the most well-known application of this procedure. It goes a long way to help women regain their confidence and improve their self-image.

Reconstructive medical tattooing can also camouflage the appearance of ugly scars due to accidents, burn wounds and surgery. Furthermore, it is used to camouflage vitiligo (patches of white skin), using flesh-coloured pigments, or to help restore the appearance of missing hair lost due to disease (cancer or alopecia) or trauma.

According to Zühlke medical tattooing can also be applied in the case of penis transplants if there is a colour discrepancy between the donor and the recipient.

This should be performed by a tattoo artist who has specialised in medical tattooing. Although there is no experience with such a procedure, since the current transplant is only the third case in the world and tattooing has not been necessary in the other two cases, it would typically be performed from six months onwards after the operation and more than one session would probably be necessary.

**Other penile replacement options**

Current surgical options for patients include penis reconstruction involving free tissue transfer. During this procedure skin and soft tissue (“flap”) is taken from the arm, reconstructed into a penis and attached to the body. A prosthesis can also be implanted to allow sexual intercourse, but it is expensive and complications may develop.

**ENDS**

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