



### Regenerative Medicine to Repair Larynx

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David Lott, M.D. is working to establish Mayo Clinic as a leader in laryngeal transplantation utilizing regenerative medicine. He detailed his plan during a recent talk given at Mayo Clinic in Rochester.

The larynx is the rigid organ situated in the neck responsible for protecting the airway, swallowing, and producing speech. When the organ is damaged or removed due to disease, patients quickly realize how large a role it played in their everyday lives. After a laryngectomy, the procedure in which the larynx is removed, the patient must breathe through an opening in their neck. This disables their ability to smell, taste, swallow, and speak.

During his talk Dr. Lott explains that 50,000 laryngectomies are performed annually and this growing number of patients must learn to live without these basic qualities of life.

Traditional larynx transplantations using a donor organ are rare, but they have been performed. However, there are several challenges to the procedure. Many patients who would benefit from the operation have been diagnosed with cancer and therefore cannot receive the required immunosuppressive therapy, as their cancer would become metastatic. Another challenge is that the voice box is very specialized and small changes to the vocal fold itself will have a dramatic impact to the patient's voice.

However, regenerative medicine offers promising new options. Dr. Lott proposes to engineer a patient-specific graft using stem cells from the patient and then implant the replacement graft at the time of the cancer surgery. This process will avoid the need for immunosuppressive therapies altogether.

The first step of the process is to build a scaffolding for the replacement larynx. This can be done by using either a 3D printing technique or by using a donor organ that has been decellularized. The scaffolding is then put inside a bioreactor, a machine used to promote cellular growth, and the patient's stem cells attach to the scaffolding. After the new larynx section is complete it will be transplanted into the patient.

Even in these early stages of the research patients have expressed desire for the procedure. Seventy-five percent of those who were asked said they would sign up for the reconstruction operation if it were an option.

Mayo Clinic is currently building the first laryngeal transplantation and research center under the directorship of Dr. Lott.

URL

<http://regenerativemedicineblog.mayoclinic.org/2015/05/26/regenerative-medicine-to-repair-larynx/>