SCOTT BRADLEY: Tracheal stenosis is a narrowing of the trachea, or the airway-- the main breathing tube. And it often requires treatment in children because it compromises their breathing significantly.

DAVID WHITE: When it's seen in babies, it is generally associated with something called complete tracheal rings, which are complete rings of cartilage that go all the way around the trachea and that are usually quite a bit smaller than the usual size of the windpipe. And so what this causes is for the windpipe to be almost funnel-shaped, usually with the narrowest part of the airway at the bottom of the airway. And when we see this, typically, the narrowing gets down to really a very small percentage of the standard dimensions of the airway.

SCOTT BRADLEY: Slide tracheoplasty is a technique of repairing tracheal stenosis or narrowing. And the way it works is by actually dividing the trachea in half, and then making incisions in the two halves of the trachea, and then sliding the two halves over each other. What this results in is an enlargement of the lumen, or the opening, of the trachea, at the expense of some loss in length of the trachea. And it's an extremely effective technique for treating tracheal stenosis.

DAVID WHITE: Well, slide tracheoplasty itself is a technically challenging procedure. But also, for the ENT specialists specifically, care of the patient before and after is something where we are heavily involved. First of all, establishing a relatively stable airway so that the child can survive long enough to make it to an operation, because about a third of the time, these are kind of acutely life-threatening scenarios.

So getting a tube in just the right position. There are special bronchoscopes that we can use to deliver oxygen to the child's lungs until we get the situation stabilized. And then also making a proper diagnosis. Those things are very important before the operation.

During the operation, bronchoscopy is also used to help identify the top and the bottom of the narrow segment from within the trachea. And generally what we do is that we have one person looking through the bronchoscope, or driving the bronchoscope and having it projected onto a screen, while, usually, the cardiothoracic surgeon is marking the top and the bottom of the narrow part, working through the child's chest.

SCOTT BRADLEY: Trachea is not in the most easy place to access in the body. It's essentially in the back and the middle of the chest. So it does require some dissection far down in the chest to access. And then the other level of difficulty comes from the fact that, often, the tracheal stenosis is associated with other defects inside the heart, which we generally repair at the same time, which does add to the complexity and therefore the risk of the operation.

I think anyone in whom there is a suspicion of some kind of a problem with the airways, such as tracheal stenosis. And a couple of the tip-offs might be noisy breathing. Sometimes that masquerades as and is treated as asthma in a child. And then the other group of patients that this might come up in are patients who undergo an operation for another defect and end up with difficulty getting off the ventilator due to problems with the airway. Those are also patients who should have their airway evaluated for possible tracheal stenosis.

DAVID WHITE: Any child that has underlying large vessel anomalies in their chest may be at risk for having complete tracheal rings. So if they've got those large vessels anomalies and breathing problems, then, generally, you want to take a look at the trachea.

SCOTT BRADLEY: The overall prognosis of children with tracheal stenosis who are treated with a slide tracheoplasty has been very good. And the long-term results have been very gratifying. And the majority of these children end up with a functionally normal airway and can go about their normal activities as they like. The results are somewhat affected by how complex the narrowing or stenosis is to begin with. And some of the children, especially those with very long, complex stenoses, have needed to come back for either bronchoscopic procedures or even occasionally for another surgery.