

0000 00:00:00:00 00:00:00:08

0001 00:00:08:22 00:00:11:22

The star surgeon, Paolo Macchiarini,
was the first-

0002 00:00:12:01 00:00:16:12

-to surgically implant a plastic trachea
in a human being.

0003 00:00:16:16 00:00:21:01

A groundbreaking surgery
gave a man back his trachea and his life.

0004 00:00:21:05 00:00:24:11

This is a synthetic organ.

0005 00:00:26:01 00:00:30:14

He promised a future with more organs made
of plastic, such as heart and lungs.

0006 00:00:30:18 00:00:35:00

We're just a few years away
from all organs being built in a lab.

0007 00:00:35:03 00:00:41:00

But privately, Macchiarini started to
discover faults with his tracheas.

0008 00:00:41:04 00:00:46:02

When I felt the scaffolds,
they were completely welded wrong.

0009 00:00:46:06 00:00:50:17

So I think we'll have to redo everything again.

0010 00:00:52:10 00:00:57:14

A surgeon at Karolinska Hospital,
who is suspected of illegal surgeries-

0011 00:00:57:18 00:01:01:18

-may be charged with manslaughter
and causing bodily harm.

0012 00:01:01:22 00:01:03:23

And patients were beginning to die.

0013 00:01:04:08 00:01:10:03

If I had a choice between a transplantation
of a synthetic trachea and the firing squad-

0014 00:01:10:07 00:01:18:01

-I would certainly choose the last option,
because this is the least painful form of execution.

0015 00:01:18:05 00:01:23:12

I didn't do anything wrong,
I just did my job.

0016 00:01:25:01 00:01:31:01

But despite the faults, Macchiarini made plans
for new operations with plastic organs.

0017 00:01:31:05 00:01:36:18

If he succeeded,
he would be revolutionising the medical world.

0018 00:01:36:22 00:01:43:00

If not... his experimental subjects
ran the risk of dying.

0019 00:02:35:05 00:02:40:13

THE EXPERIMENTS

0020 00:02:45:17 00:02:50:12

PART 2: EVERY SURGEON HAS HIS OWN GRAVEYARD

0021 00:02:56:13 00:03:01:16

The atmosphere was tense
in Macchiarini's lab in Stockholm.

0022 00:03:04:05 00:03:10:09

It was here he tried to solve the problem
with the plastic tracheas in 2012.

0023 00:03:12:00 00:03:18:00

Paolo was now fighting too succeed.
In his view, it wasn't the plastic trachea-

0024 00:03:18:03 00:03:22:08

-which had caused the death of the patient,
but the patient had simply been too ill.

0025 00:03:22:12 00:03:29:06

For clearer results, he wanted to try his method
on stronger, healthier subjects.

0026 00:03:30:16 00:03:34:04

People who were not fatally ill.

0027 00:03:38:04 00:03:44:05

Despite not having tested his method enough,
he was granted permission-

0028 00:03:44:09 00:03:49:12

-to start a clinical study on humans.

0029 00:04:00:10 00:04:03:14

The first trials would take place in Russia.

0030 00:04:03:18 00:04:08:21

For some time, they had searched for
the right experimental subjects here.

0031 00:04:09:00 00:04:12:04

Many candidates were pitted against each other.

0032 00:04:12:08 00:04:16:10

And Karolinska assisted in making the final selection.

0033 00:04:21:00 00:04:24:00

The trials were soon about to begin.

0034 00:04:24:04 00:04:29:04

Julia Tuulik had been chosen
to be the first experimental subject.

0035 00:04:29:08 00:04:35:19

She was asked to record a video,
explaining why she should be chosen for the operation.

0036 00:04:39:16 00:04:47:03

My name is Julia Tuulik. In 2008,
I was in a very serious road accident.

0037 00:04:48:13 00:04:52:05

I underwent many difficult surgeries.

0038 00:04:53:05 00:04:57:06

And I also had a tracheostomy.

0039 00:04:59:16 00:05:02:13

Now I have a tube
that constantly grinds on me.

0040 00:05:02:17 00:05:08:02

It hurts a lot when I speak,
breathe, lie down, and sleep - always.

0041 00:05:12:07 00:05:18:10

As you can see,
I'm a normal, nice, kind of pretty young girl-

0042 00:05:18:14 00:05:22:05

-and I would like to live
like other normal people.

0043 00:05:23:07 00:05:29:02

I need the tracheal transplantation
developed by Professor Macchiarini.

0044 00:05:32:07 00:05:39:08

Both Julia and Paolo were now heading
towards the same hospital in Southern Russia.

0045 00:05:39:12 00:05:44:12

At this time, Paolo's international reputation
was at its peak.

0046 00:05:44:16 00:05:50:16

A German TV crew was recording a documentary
about him and Julia's operation.

0047 00:05:50:20 00:05:54:19

This footage is taken from their raw materials.

0048 00:05:54:23 00:06:01:00

The recordings give a unique insight
into Paolo's medical experiments.

0049 00:06:02:18 00:06:08:20

The more I saw,
the more questions I had for Paolo.

0050 00:06:09:00 00:06:12:00

But I had to put them on hold-

0051 00:06:12:03 00:06:17:20

-until his experiments were completed,
a long time later.

0052 00:06:20:19 00:06:25:05

It all began four years earlier for Julia.

0053 00:06:25:09 00:06:31:09

She and her husband at the time were travelling,
when a truck crashed into them.

0054 00:06:31:13 00:06:34:03

As if by a miracle, they survived.

0055 00:06:34:11 00:06:39:12

Three medical teams patched her back up.
Her arms, her legs, and her face...

0056 00:06:39:16 00:06:44:00

Everything that could be saved
was fixed at the same time.

0057 00:06:46:09 00:06:49:16

First they worked on the teeth.

0058 00:06:49:20 00:06:55:15

I had to feed her through a straw,
as her teeth were so damaged.

0059 00:06:55:19 00:07:01:08

For one and a half months
she was fighting for her life in intensive care.

0060 00:07:01:12 00:07:04:02

Julia was pregnant-

0061 00:07:04:06 00:07:09:12

-and she would put up with just about anything
to protect her child.

0062 00:07:14:00 00:07:20:02

Julia refused to take any painkillers

in order not to hurt her child.

0063 00:07:20:06 00:07:25:06

She was in terrible pain,
yet she endured it all.

0064 00:07:27:12 00:07:30:08

Yes, stand up.

0065 00:07:30:12 00:07:35:17

It might be tricky to hold him.
Or do you want to try?

0066 00:07:37:17 00:07:40:20

They managed to save both Julia and the child.

0067 00:07:41:00 00:07:45:08

And we had a healthy boy.

0068 00:07:45:12 00:07:48:18

He was very lively.

0069 00:07:54:06 00:07:56:06

There were small steps of progress.

0070 00:07:56:10 00:08:02:01

The big thing for her was regaining her voice,
helping her to interact with her child-

0071 00:08:02:05 00:08:06:10

-and live a more independent and full life.

0072 00:08:11:20 00:08:16:18

The tracheostomy was the hardest part for us.

0073 00:08:17:22 00:08:24:22

There are people who are able
to live a normal life with tracheostomy.

0074 00:08:26:20 00:08:32:21

But Julia wasn't happy with that.
She was prepared to take it further.

0075 00:08:35:15 00:08:37:17

For our princess.

0076 00:08:37:21 00:08:42:19

In order to speak,
Julia had to cover the hole in her throat.

0077 00:08:42:23 00:08:46:12

Just the kind of hat I wanted!

0078 00:08:46:16 00:08:51:08

You can live a long life with tracheostomy.

0079 00:08:51:12 00:08:57:22

But the hole in her throat bothered her,
and she wanted to become like her old self again.

0080 00:09:08:16 00:09:14:18

During the last leg of the journey, Julia is interviewed
by the interpreter for the German crew.

0081 00:09:15:22 00:09:21:16

Tell us about when you woke up this morning,
and about how you felt.

0082 00:09:21:20 00:09:26:17

-What were your thoughts?
-I got myself ready.

0083 00:09:26:21 00:09:31:09

-Were you calm?
-Yes, shouldn't I be?

0084 00:09:31:13 00:09:34:18

Weren't you scared or worried?

0085 00:09:34:22 00:09:40:11

When you ask, I get the feeling
that you're trying to get me worked up.

0086 00:09:40:15 00:09:42:21

No, I...

0087 00:09:43:21 00:09:47:02

For now I just take it one step at a time.

0088 00:09:51:22 00:09:57:12

Is Macchiarini
the only one who can help you?

0089 00:09:57:16 00:10:00:11

I actually don't know.

0090 00:10:00:15 00:10:05:12

Hopefully it leads to something good.
Perhaps I'll get better.

0091 00:10:05:16 00:10:10:00

But you never know... what will happen.

0092 00:10:43:06 00:10:45:10

THORAC SURGERY

0093 00:10:55:01 00:10:59:00

How are you feeling,
waiting for your surgery?

0094 00:10:59:03 00:11:04:06

If you asked less I would be calm,
but now I'm starting to get nervous.

0095 00:11:04:10 00:11:10:03

That was the penultimate question.

0096 00:11:10:07 00:11:13:12

-It's as if it's all down to me.
-That's right.

0097 00:11:13:16 00:11:17:19

50% of the outcome
is dependant on your attitude.

0098 00:11:20:08 00:11:26:10

In that case, my answer is this,
at the airport I wanted to buy a Pepsi from a machine-

0099 00:11:26:14 00:11:30:01

-but I got both a Pepsi and a Snickers bar.

0100 00:11:30:05 00:11:33:18

-I believe that's a good sign.
-Sure.

0101 00:11:33:22 00:11:38:18

Right, then we'll see you at the examination,
when we will...

0102 00:11:38:22 00:11:43:05

-When is that?
-Today. The specialists will arrive...

0103 00:11:43:09 00:11:47:10

-Am I staying here?
-Yes, you stay here.

0104 00:11:56:21 00:11:58:19

Come in!

0105 00:11:59:14 00:12:05:14

This is the German physician Philipp Jungebluth,
Macchiarini's right-hand man.

0106 00:12:05:18 00:12:08:18

It was he who prepared the plastic tracheas.

0107 00:12:13:16 00:12:17:21

First, bone marrow was extracted from Julia's hipbone.

0108 00:12:20:14 00:12:23:14

The cells were mixed into a liquid-

0109 00:12:23:18 00:12:28:02

-which was then poured over
Julia's new plastic trachea.

0110 00:12:29:11 00:12:35:15

The trachea was left to rotate for several days.
A number of tracheas were prepared as extras.

0111 00:12:48:17 00:12:54:07

With one day to go before the operation,
Paolo arrived.

0112 00:12:55:13 00:12:59:04

The situation seemed pressured.

0113 00:13:04:16 00:13:07:20

Two weeks ago, I was in Moscow.

0114 00:13:08:00 00:13:14:22

They said, "OK, let's do the transplantation."
But we never received any money.

0115 00:13:15:01 00:13:22:18

Since January 2012,
we have received no money at all.

0116 00:13:42:17 00:13:46:10

-Do you want something, tea, coffee, water?
-No.

0117 00:13:46:14 00:13:50:00

I just want to talk to Igor.

0118 00:13:50:03 00:13:52:15

OK, please take a seat.

0119 00:13:53:01 00:13:57:01

Igor Polyakov
was going to operate together with Macchiarini.

0120 00:13:57:10 00:14:00:20

Nice to meet you.

0121 00:14:01:00 00:14:05:06

-Let's go to...
-A short break.

0122 00:14:05:10 00:14:10:01

We have to decide.
Do you know about the problem?

0123 00:14:10:05 00:14:16:06

-No, what is the problem?
-We were not able to continue...

0124 00:14:16:10 00:14:24:13

...because one of the prosthesis is rather short,
and the second one rather weak.

0125 00:14:24:17 00:14:30:00

The third is probably damaged,
because they find holes...

0126 00:14:30:03 00:14:34:08

It's just a break, because we have...

0127 00:14:37:16 00:14:42:01

So one scaffold is too weak.
And the other one is...?

0128 00:14:42:05 00:14:46:22

The other one is with the holes inside.

0129 00:14:47:01 00:14:49:15

The third one is good-

0130 00:14:49:19 00:14:54:04

-but the distance between the rings
is rather short.

0131 00:14:54:08 00:15:00:12

But it will be OK,
because we can cut and adjust it a little bit. Maybe.

0132 00:15:05:06 00:15:12:11

-What is the problem?
-It is too short, three millimetres.

0133 00:15:12:15 00:15:16:15

-Where? Distally or proximally?
-Distally.

0134 00:15:16:19 00:15:20:01

-Then sod it, it doesn't matter.
-Sod it? We'll use it?

0135 00:15:20:05 00:15:24:00

-Yes.
-You can stitch through the cartilage.

0136 00:15:24:03 00:15:28:10

Shall we take the best one?
The one with three?

0137 00:15:28:14 00:15:32:09

-Three what?
-Three millimetres distally.

0138 00:15:32:13 00:15:36:14

-And the other one?
-It's distally weak.

0139 00:15:36:18 00:15:40:01

But it has eight millimetres.

0140 00:15:42:11 00:15:48:18

-Is it very weak?
-Yes, I wouldn't take that one.

0141 00:15:48:22 00:15:53:21

-Then let's go with the other one.
-The one with three millimetres?

0142 00:15:54:21 00:15:59:06

-Would you like to have a look?
-There's not much to choose from.

0143 00:15:59:10 00:16:04:02

One out of two.
Both have been prepared in the same way.

0144 00:16:04:06 00:16:08:06

This is beginning to sound worrying.

0145 00:16:08:10 00:16:13:10

It seems like all the plastic tracheas
have something wrong with them.

0146 00:16:13:14 00:16:21:00

And yet, no one considered cancelling the operation,
instead everything continued as planned.

0147 00:16:25:17 00:16:30:17

Julia was now going to get information
about the functions of a plastic trachea.

0148 00:16:32:12 00:16:38:12

David Green, the CEO
of one of Paolo's American associates-

0149 00:16:38:16 00:16:42:02

-would explain this to Julia.

0150 00:16:42:06 00:16:46:17

-Hello. Is it OK to come in?
-Yes.

0151 00:16:51:06 00:16:57:02

I'm David, David Green. Nice to meet you.
Can I sit here?

0152 00:16:57:06 00:17:04:02

Olga and Viktor told me that you would like to see
the trachea scaffold and the bioreactor.

0153 00:17:10:09 00:17:15:12

-So these are sterile.
-I understand what he says.

0154 00:17:15:16 00:17:22:07

But this is exactly the same
as what will go into you tomorrow.

0155 00:17:22:11 00:17:28:06

So when the doctors came two months ago...
You can touch it, you can feel it.

0156 00:17:28:10 00:17:36:00

When the doctors came two months ago,
they took the CAT scans of your neck-

0157 00:17:36:04 00:17:39:05

-and this is made to the exact dimensions.

0158 00:17:39:09 00:17:45:13

But this has no cells.
Your trachea has cells and blood vessels.

0159 00:17:45:17 00:17:52:20

So when this has the cells on it,
it will look like normal tissue.

0160 00:17:53:00 00:17:58:21

-It looks like foam rubber.
-She says it looks like plastic.

0161 00:17:59:00 00:18:03:12

It is plastic.
It is the same plastic as this bottle is made from.

0162 00:18:03:16 00:18:07:05

It says on the bottom here,
for recycling, it says PET.

0163 00:18:07:09 00:18:12:01

This is the same plastic.
But this is food grade-

0164 00:18:12:05 00:18:18:17

-and this is medical grade, so this is much, much purer.
This is just for industrial use.

0165 00:18:18:21 00:18:24:06

-So we know this material is very safe.
-Isn't it better with a natural material?

0166 00:18:24:10 00:18:30:05

This you cannot get naturally,
so we have to make it. I can show you...

0167 00:18:30:09 00:18:34:21

-This is Mr Andemariam Beyene.
-Yes, I hear about him.

0168 00:18:35:00 00:18:38:01

He received his trachea one year ago.

0169 00:18:38:05 00:18:43:00

-It's the same?
-Very similar. Very similar to this.

0170 00:18:43:03 00:18:49:13

We all went to Iceland, with all the surgeons,
to make a celebration, like a one-year birthday party.

0171 00:18:49:17 00:18:55:19

One week earlier, David Green had been to Iceland,
where he took the photo he showed her.

0172 00:19:00:13 00:19:06:13

In the photo was Andemariam Beyene,
Paolo's first plastic trachea patient.

0173 00:19:06:17 00:19:11:17

Green and Macchiarini's team had travelled there
to celebrate the anniversary of the operation.

0174 00:19:11:21 00:19:15:15

It's of course a big moment-

0175 00:19:15:19 00:19:21:00

-for both us the team here in Iceland,
and of course the team at Karolinska...

0176 00:19:21:04 00:19:24:06

They had held a press conference
to inform about the operation.

0177 00:19:24:16 00:19:32:11

Back then nobody knew that we would be here
one year later to celebrate, so it's a huge clinical milestone.

0178 00:19:32:15 00:19:38:17

When I saw him the first time, he asked me,
"What do you want to do with me?"

0179 00:19:38:21 00:19:42:06

So I explained it to him.

0180 00:19:42:10 00:19:47:07

And his first reaction was
just to look at me and say, "You are crazy."

0181 00:19:47:11 00:19:53:10

And I said, "Yes, I am.
But this is the only chance you have."

0182 00:19:53:22 00:19:58:05

But at this point,
one week before Green's visit with Julia-

0183 00:19:58:09 00:20:04:00

-Macchiarini knew that there was a fault
also with Andemariam's trachea.

0184 00:20:04:04 00:20:07:03

He had made this discovery earlier that spring.

0185 00:20:07:07 00:20:12:14

When I felt the scaffolds,
the were completely welded wrong.

0186 00:20:12:18 00:20:19:14

They were like the POSS PCU material
that we implanted in Mr Beyene.

0187 00:20:19:18 00:20:23:07

...completely welded wrong...

0188 00:20:25:00 00:20:31:01

Macchiarini and his team covered up the seriousness
of the situation during the press conference.

0189 00:20:31:05 00:20:37:05

Did they wish to portray the operation
as a greater success than it really was?

0190 00:20:42:18 00:20:47:21

In fact, Andemariam had not been very well.

0191 00:20:49:04 00:20:57:00

His wife, Merhawit, remembers that it all seemed successful right after the operation.

0192 00:20:57:04 00:21:03:04

But slowly, it had become clear that all wasn't as it should be.

0193 00:21:03:08 00:21:06:08

These events have been so painful-

0194 00:21:06:12 00:21:11:15

-that Merhawit wished for her and the children not to be shown in the photographs.

0195 00:21:11:19 00:21:16:15

He was coughing, but we believed it was due to the cold weather.

0196 00:21:18:09 00:21:23:10

We thought he would get better after the winter.

0197 00:21:23:14 00:21:27:10

Everybody believed he would get better.

0198 00:21:27:14 00:21:30:20

Come here now!

0199 00:21:32:01 00:21:35:04

Come on!

0200 00:21:37:11 00:21:41:02

We were hoping it would pass.

0201 00:21:41:06 00:21:45:16

We never thought he was seriously ill.

0202 00:21:45:20 00:21:50:23

We said the coughing was caused by the weather.

0203 00:21:51:02 00:21:54:15

And that he would get better
once he got used to it.

0204 00:21:54:19 00:21:59:10

But as time went by, he just got worse.

0205 00:22:01:09 00:22:07:11

Merhawit also remembers the anniversary,
and how the operation was portrayed as a success.

0206 00:22:09:00 00:22:13:20

After the conference, a few days maybe...

0207 00:22:15:05 00:22:21:17

And he read something that... it is going well.

0208 00:22:21:21 00:22:27:09

And he said, "How they can write like this?"

0209 00:22:27:13 00:22:32:02

"I'm going down,
but they wrote like this."

0210 00:22:36:18 00:22:39:19

In reality, shortly before the press conference-

0211 00:22:39:23 00:22:45:02

-Andemariam had been forced
to fly to Sweden to receive care.

0212 00:22:45:06 00:22:52:09

The examination film shows inflammation,
and an increasingly problematic trachea.

0213 00:22:54:11 00:23:01:08

He'd had trouble keeping his airways open,
and he had coughed up blood and mucus.

0214 00:23:01:12 00:23:07:15

They'd had to insert a steel net
in order for him to breathe.

0215 00:23:08:17 00:23:14:14

Paolo was a chief physician at Karolinska.
Surely he couldn't have missed this?

0216 00:23:14:18 00:23:17:20

THORACIC SURGERY

0217 00:23:18:00 00:23:22:10

What we saw in Karolinska is that...

0218 00:23:22:14 00:23:29:01

...after so many hours
the scaffold gets very, very soft.

0219 00:23:29:05 00:23:34:04

So they need to be dry before implanted,
otherwise they will collapse completely...

0220 00:23:34:08 00:23:41:05

Is it possible that Paolo's team, here in Krasnodar,

was covering up the problems?

0221 00:23:43:10 00:23:47:03

Did they choose not to tell Julia
about the risks?

0222 00:23:47:07 00:23:50:08

We know that this material is very safe.

0223 00:23:50:12 00:23:56:21

Did Green want Julia to believe that everything
had been tried and tested, instead of focusing on the risks?

0224 00:23:57:20 00:24:01:22

So this can turn like this, to turn it around.

0225 00:24:02:01 00:24:09:02

And this is mounted in here, and then the stem cells
are poured in here. And this rotates very slowly.

0226 00:24:09:06 00:24:15:14

They're in the bioreactor for two days,
it's completely sterile, and then it's done.

0227 00:24:15:18 00:24:22:09

And tomorrow they will put this into you.
But after it goes in, it still has no blood supply.

0228 00:24:22:13 00:24:27:20

It takes about seven days for your body
to grow new blood vessels through the scaffold-

0229 00:24:27:22 00:24:30:03

-and then it will be your new trachea.

0230 00:24:30:07 00:24:34:05

And how will I feel during those seven days?

0231 00:24:34:09 00:24:38:07

It will be just like this.
You'll be sitting in bed, lying in bed.

0232 00:24:38:11 00:24:42:05

You're in very good hands.
Paolo is the best surgeon in the world.

0233 00:24:42:07 00:24:45:10

There's no one better
who can do this surgery for you.

0234 00:24:48:19 00:24:52:00

-I know.
-You know? You are right.

0235 00:24:53:05 00:24:57:11

Very nice meeting you, Julia. Bye-bye.

0236 00:24:57:15 00:25:00:02

Bye-bye. Thanks.

0237 00:25:02:17 00:25:04:09

Bye.

0238 00:25:16:06 00:25:20:03

This is the final brainstorming
before the transplantation.

0239 00:25:20:07 00:25:26:03

Julia, tomorrow, will be the first patient
entering our clinical trial.

0240 00:25:26:07 00:25:32:07

We need to go through every single step.

0241 00:25:33:01 00:25:36:10

When I watch this,
I wonder why it all seems so rushed.

0242 00:25:36:19 00:25:40:21

This distance should cover it.

0243 00:25:41:00 00:25:47:17

We need to give credit to Professor Porchanov.
The pressure that he and I have-

0244 00:25:47:21 00:25:53:12

-from different ministry authorities,
is extremely high.

0245 00:25:53:16 00:26:00:11

They want that this will be a success,
and I'm confident that we will do the best.

0246 00:26:00:15 00:26:05:16

Was it the pressure from ministers
and financiers that made Paolo push on?

0247 00:26:05:20 00:26:11:10

If we can do the transplantation
by just doing two surgical incisions only-

0248 00:26:11:14 00:26:14:06

-this would be a major achievement.

0249 00:26:14:10 00:26:20:09

She will be doing interviews,
and so forth, and so forth...

0250 00:26:26:21 00:26:31:21

Shortly before the operation,
Paolo and Julia finally met.

0251 00:26:38:23 00:26:42:06

-You look beautiful!
-Thank you.

0252 00:26:43:20 00:26:47:09

Even though Julia has been informed
that this is an experiment-

0253 00:26:47:11 00:26:49:14

-and perhaps she's also signed a document-

0254 00:26:49:18 00:26:55:18

-she doesn't seem to understand the risks
she is about to take.

0255 00:26:55:22 00:27:00:10

Regardless of whether we transplant the trachea,
the hole still needs to be sealed.

0256 00:27:00:14 00:27:08:17

It's not a question of cosmetics,
or *how* you're going to breathe-

0257 00:27:08:21 00:27:14:12

-but there might be an accident,
and then you won't be able to breathe at all.

0258 00:27:14:16 00:27:18:00

Not even her doctor, Polyakov-

0259 00:27:18:03 00:27:24:05

-seems to have been informed
of the set-backs from Paolo's method.

0260 00:27:24:15 00:27:30:02

Do what you have to,
but consider my wishes for the transplant.

0261 00:27:30:06 00:27:33:06

We have to know the wishes.

0262 00:27:33:10 00:27:40:15

I realise that some scarring is unavoidable,
but I'd prefer it if you didn't cut the breasts.

0263 00:27:40:19 00:27:44:17

Show on top of your clothes
where you don't want any scars.

0264 00:27:48:06 00:27:52:17

OK, so this is the zone forbidden.

0265 00:27:52:21 00:27:58:04

OK? Scars, but out of this zone.

0266 00:27:58:08 00:28:02:07

-So, what do you say, Julia?
-What do you choose?

0267 00:28:02:11 00:28:07:19

Which part do we choose? Not here?
Not this part...

0268 00:28:07:23 00:28:12:17

-On this part, here is fine.
-Only here.

0269 00:28:29:00 00:28:34:15

The time had finally come.

Paolo would get to implant a plastic trachea-

0270 00:28:34:19 00:28:40:19

-in a test patient
who quite possibly had a long life ahead of her.

0271 00:29:36:16 00:29:40:03

It is a historic moment.

0272 00:29:49:19 00:29:51:11

Carefully.

0273 00:30:25:04 00:30:28:22

Would the new trachea work?

0274 00:30:30:19 00:30:35:02

Eventually,
Julia awoke from the narcosis.

0275 00:30:42:06 00:30:48:23

Well done! Wake up, sweetheart.
We'll remove the tube once you're awake.

0276 00:30:49:02 00:30:51:19

Bend it! Bend it even more.

0277 00:30:51:23 00:30:57:22

-Even higher.
-That's fine. Put your leg down.

0278 00:30:58:22 00:31:01:22

-Oops.
-Wow!

0279 00:31:02:01 00:31:06:05

-Put your leg down, sweetheart.

-No messing around.

0280 00:31:06:09 00:31:08:18

She has to speak.

0281 00:31:08:22 00:31:12:02

-She opens her eyes.
-She has to speak.

0282 00:31:12:06 00:31:18:08

-How are you?
-Julia, it's me. Can you hear me?

0283 00:31:18:12 00:31:23:05

The surgery is over.
Can you say something? Say something.

0284 00:31:25:08 00:31:28:05

-Say something.
-Thank you.

0285 00:31:28:09 00:31:31:15

-Good!
-Congratulations to everybody!

0286 00:31:31:19 00:31:37:08

Thanks to everybody in the team!
Thanks to our beloved party!

0287 00:31:37:12 00:31:41:00

Calm down. It's all over.

0288 00:31:41:03 00:31:46:14

We have removed everything,
and it looks good.

0289 00:31:46:18 00:31:52:04

You don't need to tense up like this.
Just relax, relax...

0290 00:31:52:08 00:31:55:12

No, don't cry.

0291 00:32:04:17 00:32:09:07

Will I be able to play with my son?

0292 00:32:09:11 00:32:13:12

Yes, as much as you want.

0293 00:32:13:16 00:32:16:05

Don't worry.

0294 00:32:17:09 00:32:19:20

Everything is fine.

0295 00:32:26:05 00:32:30:12

She's asking
if she'll be able to play with her son again.

0296 00:33:29:07 00:33:31:21

THORACIC SURGERY

0297 00:33:46:10 00:33:52:00

Already after a few days,
a press conference was called.

0298 00:34:03:10 00:34:06:07

Julia, Julia...

0299 00:34:13:13 00:34:17:15

This is Julia.

0300 00:34:17:19 00:34:24:01

When I first met Julia,
she wasn't able to play with her child.

0301 00:34:24:05 00:34:28:02

It was a very emotional moment for me.

0302 00:34:30:19 00:34:34:13

And I immediately said, "This is the right patient."

0303 00:34:37:09 00:34:44:14

And I still do not believe that a few days ago,
she couldn't breathe and talk normally.

0304 00:34:44:18 00:34:48:23

She's a little bit afraid of you-

0305 00:34:49:02 00:34:52:21

-so please be very sweet...

0306 00:34:53:23 00:34:59:20

She can answer all the questions,
if you would like.

0307 00:35:03:16 00:35:08:07

I'm not afraid of anyone.

0308 00:35:14:22 00:35:21:22

A new era has begun for you. Congratulations!
What are you going to do? What kind of work?

0309 00:35:22:01 00:35:27:10

For four years you have...
You have lost four years of your life!

0310 00:35:27:14 00:35:31:05

I don't know what I'm going to do.

0311 00:35:31:09 00:35:39:04

First I need to get well,
and then I'd like to continue my studies.

0312 00:35:39:08 00:35:44:12

I can't give you a concrete answer,
I'm worried I'll disappoint you.

0313 00:35:52:14 00:35:55:23

It seemed like a success all around.

0314 00:35:57:01 00:36:02:01

Julia was seemingly on the road to complete recovery.

0315 00:36:02:05 00:36:08:20

And Macchiarini could show off
a groundbreaking transplantation.

0316 00:36:11:09 00:36:16:12

He could continue doing research
and performing operations.

0317 00:36:21:08 00:36:23:17

Cheers!

0318 00:36:40:04 00:36:47:00

Another experimental subject had been operated on
almost immediately afterwards, it was Alexander Zozulya.

0319 00:36:53:09 00:36:58:00

The operation was followed
in an adjacent room.

0320 00:36:58:03 00:37:02:22

Here was paediatric surgeon Mark Holterman.

0321 00:37:03:01 00:37:10:18

Together with Paolo, he would soon
implant a plastic trachea in a child.

0322 00:37:10:22 00:37:13:23

Parallel with the trials in Russia-

0323 00:37:14:02 00:37:19:14

-Paolo continued to implant plastic tracheas
in patients who were seriously ill.

0324 00:37:19:18 00:37:25:03

The operation would take place in the US,
on 2-year-old Hannah Warren.

0325 00:37:25:07 00:37:28:05

-It's OK.
-Don't worry about it.

0326 00:37:31:17 00:37:35:19

And then there was one more patient in waiting.

0327 00:37:37:07 00:37:41:06

22-year-old Yeşim Çetir from Turkey.

0328 00:37:43:08 00:37:47:13

Yeşim was not part of the Russian trials-

0329 00:37:47:17 00:37:52:17

-but would be operated on
at Karolinska Hospital-

0330 00:37:52:21 00:37:57:23

-were Macchiarini's plastic trachea transplants
first saw the light of day.

0331 00:37:59:21 00:38:04:07

But Yeşim's operation
failed already from the start.

0332 00:38:04:11 00:38:10:01

The plastic trachea wouldn't take hold,
and it lost its shape.

0333 00:38:10:05 00:38:16:00

It had to be cleaned every four hours,
to prevent her from suffocating.

0334 00:38:16:04 00:38:23:00

After a year, Yeşim had a new plastic trachea implanted,
but matters didn't improve.

0335 00:38:24:09 00:38:27:11

In the end, Yeşim stayed for over three years.

0336 00:38:27:15 00:38:32:15

One of the longest staying
intensive care patients ever at Karolinska.

0337 00:38:35:11 00:38:40:02

Hannah Warren
also remained in intensive care.

0338 00:38:43:08 00:38:48:21

She died three months after
having received her plastic trachea.

0339 00:38:54:19 00:39:01:18

The condition of Macchiarini's first plastic trachea patient,
Andemariam, also worsened.

0340 00:39:03:05 00:39:09:18

He felt that there was something wrong with his trachea,
and he tried to reach Macchiarini.

0341 00:39:12:10 00:39:16:21

Andemariam left Iceland
and travelled to Sweden-

0342 00:39:17:00 00:39:24:03

-to meet Dr Paolo,
who had promised to examine him.

0343 00:39:24:07 00:39:28:20

But when he arrived in Stockholm,
Dr Paolo wasn't there.

0344 00:39:30:01 00:39:34:02

He was told that if he wished to see him-

0345 00:39:34:06 00:39:38:07

-he would have to go to either Italy or the USA.

0346 00:39:38:11 00:39:43:22

But Andit wasn't able to go to the USA or to Italy.

0347 00:39:44:01 00:39:48:23

He needed to get care either in Iceland or in Sweden.

0348 00:39:55:12 00:40:01:16

Not only the patients felt that Paolo
wasn't there when they needed him.

0349 00:40:04:11 00:40:09:21

While Macchiarini travelled across the world,
the hospital staff back in Stockholm-

0350 00:40:10:00 00:40:15:00

-was left to deal with the patients
and their severe complications.

0351 00:40:15:03 00:40:21:03

One of the doctors
dealing with Paolo's patients was Thomas Fux.

0352 00:40:21:07 00:40:24:07

A meeting was called-

0353 00:40:24:11 00:40:29:23

-where Paolo Macchiarini
would present the results-

0354 00:40:30:02 00:40:35:21

-of all the patients he had operated on,
case by case.

0355 00:40:36:00 00:40:41:02

The information was very worrying.

0356 00:40:41:06 00:40:45:13

The foundation was crumbling.

0357 00:40:45:17 00:40:51:18

The meeting generated
more questions than answers.

0358 00:40:53:21 00:40:59:08

Even the management started to
have issues with Macchiarini's methods.

0359 00:40:59:12 00:41:05:15

In October 2013, his transplantations

at Karolinska were stopped.

0360 00:41:07:20 00:41:14:06

But since Paolo had been stopped,
his patients were left without specialist help.

0361 00:41:14:10 00:41:18:23

Thomas Fux tried to fill the void.

0362 00:41:19:02 00:41:25:03

He and his colleagues would now
make a very surprising discovery.

0363 00:41:25:07 00:41:32:01

Our approach was to look for a possible solution.

0364 00:41:32:05 00:41:39:14

A therapeutic remedy
for a deeply suffering patient.

0365 00:41:42:10 00:41:45:20

So we buried ourselves into the literature-

0366 00:41:46:00 00:41:52:07

-and read through
Paolo Macchiarini's published studies.

0367 00:41:53:08 00:41:58:13

Fairly soon, or rather straight away,
we got the impression-

0368 00:41:58:17 00:42:04:17

-that the material he had published
in his scientific reports-

0369 00:42:04:21 00:42:10:10

-did not correspond
to the clinical reality we had experienced.

0370 00:42:14:01 00:42:21:06

Their suspicions concerning the truth in Paolo's reports
were soon about to be strengthened.

0371 00:42:27:07 00:42:32:08

Andemariam returned one last time
to Karolinska.

0372 00:42:35:05 00:42:41:14

He was in terrible pain.
He suffered immensely.

0373 00:42:49:15 00:42:55:04

When I arrived, he was barely alive,
I wasn't able to make contact with him.

0374 00:42:55:08 00:42:57:14

He was dying.

0375 00:43:02:05 00:43:08:00

I don't think he heard anything I said to him.

0376 00:43:08:04 00:43:11:19

The only sign of life was that he was breathing.

0377 00:43:33:23 00:43:40:14

Andemariam Teklesenbet Beyene
passed away in January, 2014.

0378 00:43:41:20 00:43:47:02

And from the autopsy report,
the doctors got the truth about his plastic trachea.

0379 00:43:47:04 00:43:48:23

AUTOPSY REPORT

0380 00:43:49:00 00:43:53:01

There were no signs
of a new organ having been created.

0381 00:43:53:05 00:43:55:10

Only inflammation and dead tissue.

0382 00:43:55:12 00:43:57:21

"severe inflammation"
"necrotic tissue"

0383 00:43:57:23 00:44:01:23

The plastic trachea was so loose
that it could simply be lifted out.

0384 00:44:02:00 00:44:04:02

"90% loose"

0385 00:44:04:04 00:44:07:05

It was far worse than the doctors had imagined.

0386 00:44:07:09 00:44:13:11

They decided to compare the test results
of the plastic trachea patients in Sweden-

0387 00:44:13:15 00:44:19:00

-to the way they had been described
in Macchiarini's scientific reports.

0388 00:44:20:02 00:44:23:22

They soon discovered a pattern.

0389 00:44:29:10 00:44:34:10

Apart from the fact that
what was written in the articles-

0390 00:44:34:14 00:44:38:20

-was inaccurate, manipulated, or embellished-

0391 00:44:39:00 00:44:46:04

-the most important information, the worst part,
had consistently been left out.

0392 00:44:46:08 00:44:53:16

The trachea broke down. It came loose at both ends,
where it had been stitched together.

0393 00:44:53:20 00:44:59:19

There are chronic infections,
the plastic tube did not knit...

0394 00:44:59:23 00:45:05:06

There's inflammation, which results in
granulation tissue at the connecting points-

0395 00:45:05:10 00:45:12:05

-and this might strangle, i.e. suffocate the patient,
unless it is removed.

0396 00:45:14:17 00:45:18:18

The plastic trachea eats its way
into the oesophagus...

0397 00:45:18:22 00:45:24:05

...creating a connection
through the oesophagus...

0398 00:45:24:09 00:45:29:22

...and the chest cavity,
the chest, and the airway.

0399 00:45:33:01 00:45:38:01

There is information about certain problems
in Macchiarini's work-

0400 00:45:38:05 00:45:43:05

-but nothing about how many times
Andemariam needed emergency treatment.

0401 00:45:43:09 00:45:48:12

And nothing about a chronically infected trachea
that eventually came loose.

0402 00:45:48:16 00:45:55:07

Or about the fact that Yeşim had endured
more than 7000 examinations and operations.

0403 00:45:55:11 00:46:02:14

The doctors now inform their superiors,
at the Institute, and at the University Hospital.

0404 00:46:02:18 00:46:08:20

Our assessment is that they are
misleading the scientific society-

0405 00:46:09:00 00:46:16:17

-and they are misleading practising physicians,
as well as patients.

0406 00:46:16:21 00:46:20:09

It is extremely serious.

0407 00:46:20:13 00:46:26:07

Macchiarini's operations
had been stopped in Sweden.

0408 00:46:26:11 00:46:31:21

But Fux and his colleagues suspected
that the faults in Paolo's work-

0409 00:46:32:00 00:46:37:01

-still led to further operations,
and further suffering, abroad.

0410 00:46:38:00 00:46:44:14

The doctors asked their superiors to inform
the world of what had really been going on.

0411 00:46:46:06 00:46:51:08

Otherwise other patients risked
receiving Paolo's plastic trachea.

0412 00:46:52:12 00:46:55:14

Others like Julia.

0413 00:46:58:02 00:47:03:12

She was one of the patients,
meant to prove that the method worked.

0414 00:47:03:16 00:47:07:07

How did she get on after the operation?

0415 00:47:08:07 00:47:13:03

This is something Macchiarini
has kept very quiet about, officially.

0416 00:47:13:07 00:47:19:01

A few days ago,
she couldn't breathe or talk normally.

0417 00:47:26:01 00:47:32:05

Shortly after the surgery,
the doctors examined the results of Julia's operation.

0418 00:47:43:20 00:47:47:19

-Here is the upper part.
-What is that fold?

0419 00:47:47:23 00:47:52:17

It has folded over,
and it seems to have become completely...

0420 00:47:52:21 00:47:57:04

-What can be done about it?
-Nothing.

0421 00:47:59:19 00:48:04:02

-The trachea isn't collapsing.
-It is bent.

0422 00:48:13:12 00:48:20:06

-Doctor, is the prosthesis working?
-Yes, it works perfectly.

0423 00:48:20:10 00:48:23:09

It hasn't gotten...

0424 00:48:25:00 00:48:28:07

-Has the prosthesis folded over badly?
-No, no.

0425 00:48:28:11 00:48:35:05

-But you said it would bend even more.
-It hasn't happened with other patients.

0426 00:48:35:09 00:48:38:15

Do you want to know something?
Stop crying.

0427 00:48:38:19 00:48:44:09

Remember that the wounds in a winner heal quicker.
Stop crying!

0428 00:48:44:13 00:48:49:11

-I can hardly get any air. It's difficult to breathe.
-Is that why you're crying?

0429 00:48:49:15 00:48:52:20

Everything is as it should be.
Stay strong.

0430 00:48:58:14 00:49:03:14

This is the last I saw of the German recordings.

0431 00:49:03:18 00:49:07:19

Watching this footage
has generated many questions for Paolo.

0432 00:49:07:23 00:49:13:13

But first I had to follow this story until the end.

0433 00:49:13:17 00:49:21:05

I suspected that I would only get
one more chance to interview Paolo.

0434 00:49:22:08 00:49:29:04

When he and his team flew off to the next operation,
everything went back to normal...

0435 00:49:30:20 00:49:34:00

...for everybody, except for Julia.

0436 00:49:39:11 00:49:42:23

But all wasn't as it should be.

0437 00:49:45:18 00:49:50:21

When she came home, she was breathing normally.

0438 00:49:51:00 00:49:56:00

But there was a strange smell.

0439 00:49:56:04 00:49:59:16

It was somehow synthetic.

0440 00:50:02:07 00:50:07:00

She had a fever... and she was swollen.

0441 00:50:08:05 00:50:13:06

She had a shortness of breath.
All sorts of things...

0442 00:50:14:17 00:50:18:02

She had severe breathing difficulties,
and she coughed a lot.

0443 00:50:18:06 00:50:24:23

She had bouts of coughing, lasting for hours,
and she could barely breathe.

0444 00:50:26:17 00:50:32:20

Julia had to be rushed back
to the hospital in Krasnodar to get help.

0445 00:50:35:12 00:50:39:13

Her surgeon told me
about what had gone wrong.

0446 00:50:39:17 00:50:45:20

First of all there was a problem
with the scaffold. It collapsed.

0447 00:50:46:18 00:50:49:17

It collapsed over time.

0448 00:50:51:18 00:50:57:22

The surrounding tissue kept pushing
the trachea together, and it gave way.

0449 00:50:58:01 00:51:03:04

You had to constantly keep the airway open.

0450 00:51:09:15 00:51:14:15

Polyakov had to insert a steel stent
into Julia's trachea-

0451 00:51:14:19 00:51:21:20

-to prevent her from suffocating.
She remained in Krasnodar for months.

0452 00:51:24:02 00:51:30:12

Without the plastic trachea, Julia might
have lived for decades, perhaps even longer.

0453 00:51:32:07 00:51:36:18

But the situation
continued to be life-threatening.

0454 00:51:37:11 00:51:45:00

I asked about Macchiarini,
and they claimed to have regular contact.

0455 00:51:45:03 00:51:52:01

But he was already like a ghost,
and I realised he wasn't very interested.

0456 00:51:52:05 00:51:54:20

And now she began to stink.

0457 00:51:56:12 00:52:02:08

Julia was able to return home,
but she was constantly suffering from infections.

0458 00:52:09:08 00:52:16:11

Macchiarini's team had no other solution
than to insert a new plastic trachea.

0459 00:52:22:00 00:52:25:17

But that didn't solve anything.

0460 00:52:27:16 00:52:34:21

It smelled of rotting flesh.
The smell was so awful that...

0461 00:52:35:00 00:52:39:08

It was really... It was horrendous.

0462 00:52:40:12 00:52:46:02

I realised that she was rotting while still alive.

0463 00:53:00:05 00:53:06:09

Here in her apartment,
Julia spent her final time alive.

0464 00:53:06:13 00:53:13:00

She coughed up blue suture thread,
along with bits of flesh.

0465 00:53:19:12 00:53:24:14

Julia's sister-in-law remembers her final days.

0466 00:53:26:09 00:53:33:19

She said, "I'm so tired, I have no strength to live.
I'm completely exhausted."

0467 00:53:36:22 00:53:39:12

She said...

0468 00:53:40:22 00:53:47:00

...that she was very sad
she would not get to see her son grow up...

0469 00:53:47:03 00:53:50:02

...and that she had wanted to live.

0470 00:54:02:07 00:54:08:00

Julia Tuulik died at home alone,
in September, 2014.

0471 00:54:24:22 00:54:30:15

It had then been seven months since the doctors
at Karolinska had warned their superiors-

0472 00:54:30:19 00:54:35:23

-that Paolo's methods
could result in the death of his patients.

0473 00:54:36:02 00:54:42:02

One might think that such serious warning signs
would have made the management at Karolinska-

0474 00:54:42:06 00:54:45:06

-act a long time ago.

0475 00:54:45:10 00:54:51:14

But despite several meetings, emails,
and conversations, there was no reaction.

0476 00:54:54:06 00:55:01:15

And in Russia, Paolo's trials continued
on almost completely healthy Dmitri Onogda.

0477 00:55:06:17 00:55:12:17

The doctors got more and more frustrated
with their superior's lack of reaction.

0478 00:55:12:21 00:55:18:22

Therefore they decided to take drastic action.
They documented all the faults they could find-

0479 00:55:19:01 00:55:26:16

-in a 400-page-long report and filed it
with the Vice-Chancellor at Karolinska Institute.

0480 00:55:26:20 00:55:34:15

We were worried when we handed it in,
as we realised it would be disastrous-

0481 00:55:34:19 00:55:41:10

-not only for Macchiarini and his team,
but for the Karolinska Institute as a whole.

0482 00:55:41:14 00:55:46:22

We thought it would have a major impact,
but nothing happened.

0483 00:55:47:01 00:55:53:03

...until the story was published
in the New York Times and Nature.

0484 00:55:53:07 00:56:00:14

Although lives were at stake, it wasn't
until nine months after the doctors' warning-

0485 00:56:00:18 00:56:07:07

-that the Vice-Chancellor at Karolinska Institute
commissioned an impartial inspection.

0486 00:56:07:11 00:56:14:05

And that's when our situation at work
started to get uncomfortable.

0487 00:56:16:10 00:56:22:16

First we were told
that we would be reported to the Police.

0488 00:56:22:20 00:56:28:20

But that was changed, and instead
we would receive the most severe warning there is-

0489 00:56:29:00 00:56:35:09

-from our Operations Manager
on the basis of breach of medical records.

0490 00:56:35:13 00:56:41:03

What was going on in Karolinska Hospital
and Karolinska Institute?

0491 00:56:41:07 00:56:44:07

Were they trying to silence the doctors?

0492 00:56:44:11 00:56:49:21

Did they not want to investigate
Macchiarini's operations and his research?

0493 00:56:50:00 00:56:56:04

Paolo Macchiarini
is trusted by the Karolinska Institute.

0494 00:56:56:08 00:56:59:08

I had seen patient after patient die.

0495 00:56:59:12 00:57:05:07

According to Macchiarini,

the tracheas had nothing to do with the deaths.

0496 00:57:05:11 00:57:10:11

He had presented all facts correctly,
and always been there for his patients.

0497 00:57:10:15 00:57:16:18

But was this really the case? In part three,
Paolo will answer all of my questions.

0498 00:57:16:22 00:57:19:22

Perhaps there's something I've missed.

0499 00:57:21:15 00:57:25:20

-Your profession is?
-...because she had so much...

0500 00:57:26:00 00:57:29:19

Answer my question, "Your profession is?"

0501 00:57:29:23 00:57:34:04

-How do you mean?
-What are you doing as a job?

0502 00:57:34:08 00:57:40:01

-You have to explain what you mean.
-You are a TV producer, right?

0503 00:57:40:05 00:57:45:05

How can you possibly understand
all the details of a medical evaluation?

0504 00:57:45:09 00:57:50:07

You know all the details of a medical evaluation?
Of course not.

0505 00:57:50:11 00:57:53:16

But I've read all the documents of the investigation.

0506 00:57:53:20 00:57:59:22

This is totally wrong.
You should revise your English.