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00:00:00,536 --> 00:00:02,386
[Josh Byerly] Hi everybody.

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00:00:02,386 --> 00:00:04,076
Josh Byerly here in Mission Control Houston.

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00:00:04,076 --> 00:00:07,486
I'm joined by my friend Ed Powers
who is a Flight Surgeon here at NASA.

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00:00:07,486 --> 00:00:11,126
And, you know, we talk a lot about
experiment work and what the crew is doing.

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00:00:11,126 --> 00:00:13,836
They do quite a bit of human
research and things like that

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00:00:13,836 --> 00:00:15,216
on their own bodies while they're up there.

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00:00:15,216 --> 00:00:19,246
But figured it would be a good chance to get a
flight surgeon in here and actually talk about,

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00:00:19,426 --> 00:00:21,466
you know, what you do first
of all as a flight surgeon.

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00:00:21,466 --> 00:00:24,566
'Cause it's a whole lot more than I think
than what people realize and also, you know,

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00:00:24,566 --> 00:00:27,836
what are some of the difficulties of dealing
with a crew member who's not here on Earth.

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00:00:27,836 --> 00:00:29,296
So, first of all welcome.

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00:00:29,296 --> 00:00:30,106

Thank you for joining us.

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00:00:30,516 --> 00:00:33,836

Talk just a minute about what you do on a, just a daily basis.

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00:00:34,156 --> 00:00:34,476

[Dr. Ed Powers] Okay.

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00:00:34,526 --> 00:00:40,216

Well flight surgeons are kind of critical to maintaining the, you know, the status,

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00:00:40,216 --> 00:00:42,696

health status of the crew members by monitoring them basically.

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00:00:43,926 --> 00:00:52,326

Every day we, folks who are assigned to crew members to look out for them on a weekly basis,

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00:00:52,326 --> 00:00:55,066

we interview them and make sure for about 15 minutes at a time,

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00:00:55,066 --> 00:00:56,386

make sure they are doing well on orbit.

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00:00:56,386 --> 00:00:59,576

It really begins about two years before they launch.

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00:01:00,126 --> 00:01:04,286

The flight surgeons who are assigned to an astronaut basically get to know them very well

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00:01:04,286 --> 00:01:06,206

and help in their training
so that they know what

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00:01:06,206 --> 00:01:08,506

to do a medical emergency
onboard the space station.

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00:01:09,136 --> 00:01:13,606

They go through various training sessions
including running a cardiac resuscitation

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00:01:13,766 --> 00:01:15,716

and go through various simulations.

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00:01:16,386 --> 00:01:20,656

And so this allows us to get to know the crew
members very well and we develop a relationship,

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00:01:20,656 --> 00:01:23,336

a very good working relationship,
with them and the amount of trust,

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00:01:23,516 --> 00:01:25,376

you know, that goes along with that.

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00:01:25,756 --> 00:01:27,146

[Josh] What do they, what
do they have up on orbit?

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00:01:27,146 --> 00:01:30,956

I mean they got the Crew Health Care, basically
what amounts to a mini-hospital onboard.

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00:01:30,956 --> 00:01:34,436

But talk about, I mean, cause you can't just
run down to the drugstore and get, you know,

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00:01:35,066 --> 00:01:36,786

get some ibuprofen or something if you need it.

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00:01:36,786 --> 00:01:38,146

So how well are they stocked?

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00:01:38,146 --> 00:01:39,156

What do they have up there?

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00:01:39,526 --> 00:01:42,056

[Powers] Well they have a variety of commonly used medicines, you know,

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00:01:42,056 --> 00:01:44,096

Tylenol and various other things are there.

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00:01:44,146 --> 00:01:48,966

But we also have medicines that we think could be useful

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00:01:48,966 --> 00:01:51,336

in case some potential emergencies could occur.

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00:01:51,386 --> 00:01:55,436

You know we have advanced cardiac life support medications onboard they're trained with

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00:01:55,616 --> 00:01:59,706

and various antibiotics and things that we think might be necessary

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00:02:00,176 --> 00:02:01,506

if something were to happen up there.

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00:02:02,506 --> 00:02:07,106

[Josh] So talk, as a doctor, how, you know, doctors use a lot of their senses, their sight,

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00:02:07,106 --> 00:02:09,076

their hearing, they listen, the touch.

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00:02:09,076 --> 00:02:12,626
You don't have any of that really
whenever your crew member's 250 miles

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00:02:12,626 --> 00:02:14,696
up in space going around the Earth.

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00:02:14,696 --> 00:02:16,686
So how difficult is that?

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00:02:16,686 --> 00:02:17,906
What kind of challenges do you have?

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00:02:18,086 --> 00:02:19,286
[Powers] Well it is a bit of a challenge.

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00:02:19,286 --> 00:02:22,566
And that's part of, part of the reason why we
develop such a close relationship with them,

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00:02:22,566 --> 00:02:27,536
in this pre-launch timeframe and the
training, is because we get to know sort

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00:02:27,816 --> 00:02:32,146
of what they're capable of doing and
how and what their experience level is

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00:02:32,146 --> 00:02:35,456
and how they approach a problem
when it comes to medical issues.

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00:02:35,876 --> 00:02:38,086
And so it is a little bit of a challenge.

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00:02:38,086 --> 00:02:43,996
But at the same time as we get to know them very
closely we are able to trust their eyes and ears

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00:02:44,366 --> 00:02:47,266
and work with them try to
diagnose any issues that go on.

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00:02:47,266 --> 00:02:51,416
Fortunately they tend to be extremely healthy
when we launch them which is very helpful.

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00:02:52,046 --> 00:02:54,256
But occasionally something will come about.

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00:02:54,736 --> 00:02:57,776
And of course we have the luxury once in awhile
of having a physician astronaut on board.

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00:02:57,776 --> 00:02:57,996
[Josh] Right.

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00:02:58,326 --> 00:03:01,706
[Powers] And that makes our
jobs quite a bit easier.

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00:03:01,706 --> 00:03:04,806
[Josh] Let's talk about, we were out,
I guess it was a couple of weeks ago,

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00:03:04,806 --> 00:03:07,616
out at The National Space Biomedical
Research Institute here in Houston.

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00:03:07,616 --> 00:03:09,396
They just opened up a brand new facility here.

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00:03:09,396 --> 00:03:12,736
And there's a lot of scientists there
and doctors and these Ph.D.s talking

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00:03:12,736 --> 00:03:17,396
about miniaturization and, you know,
from what I understand that we used

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00:03:17,396 --> 00:03:20,886
to have a very large Ultrasound card onboard
the station that took up an entire rack

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00:03:21,306 --> 00:03:24,056
and now we got things down to
basically the size of a laptop.

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00:03:24,056 --> 00:03:29,386
So talk a little bit about how the space station
and, you know, we sort of force ourselves

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00:03:29,386 --> 00:03:32,486
to go small and go efficient, how does
that lead to better stuff here on Earth

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00:03:32,486 --> 00:03:33,826
for hospitals and things like that.

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00:03:34,316 --> 00:03:37,116
[Powers] Well of course smaller
is better when it come,

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00:03:37,166 --> 00:03:39,006
as long as you can keep the same fidelity.

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00:03:39,056 --> 00:03:45,176
Smaller is better and as far as keeping track of
inventory and launching into orbit and that sort

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00:03:45,176 --> 00:03:47,396
of thing from our standpoint is very helpful.

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00:03:48,096 --> 00:03:49,886
But there are remote applications as well.

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00:03:49,886 --> 00:03:53,996
You know there are places in the world where

you just can't get medical care at the level

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00:03:54,036 --> 00:03:55,336

that you would see say in Houston.

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00:03:55,606 --> 00:03:55,796

[Josh] Right.

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00:03:55,796 --> 00:03:58,416

[Powers] So to have a remote capability as something small

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00:03:58,416 --> 00:04:02,356

and transportable is very helpful when you get out away from civilization a bit.

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00:04:02,666 --> 00:04:02,856

[Josh] Yeah.

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00:04:03,326 --> 00:04:04,776

How much of the crew members do, you know,

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00:04:04,956 --> 00:04:07,876

basically finding out about how their own bodies react to being in space

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00:04:07,966 --> 00:04:09,626

and what is that going to teach us going on?

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00:04:09,626 --> 00:04:12,986

I mean, you know, is it the more that we investigate it the more we learn?

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00:04:12,986 --> 00:04:14,016

I mean is there more mysteries?

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00:04:14,016 --> 00:04:16,116

Because, you know, we've talked about how we've even learned

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00:04:16,116 --> 00:04:19,026

that the immune system reacts differently
from being up there with no gravity.

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00:04:19,026 --> 00:04:20,356

So what, what did we learn?

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00:04:20,356 --> 00:04:20,686

[Powers] That's true.

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00:04:20,686 --> 00:04:25,686

There's a number of research studies
going on, especially with universities

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00:04:25,736 --> 00:04:27,196

that are looking at the immune system.

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00:04:27,196 --> 00:04:30,356

And there's a little bit of a decrease in immune
response when you get up on orbit, you know,

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00:04:30,356 --> 00:04:33,296

a tendency to maybe be a
little bit more susceptible

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00:04:33,296 --> 00:04:35,306

to getting a cold or something
along those lines.

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00:04:35,816 --> 00:04:37,566

There are also bone density issues.

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00:04:37,566 --> 00:04:41,376

You know as you go in microgravity,
gravity is not pulling down on the bones.

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00:04:41,376 --> 00:04:43,546

There's not stimulation there

to keep the bones healthy.

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00:04:43,696 --> 00:04:48,386

So we have learned how to supplement that by doing daily exercise,

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00:04:48,446 --> 00:04:51,056

both aerobic and resistive exercise.

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00:04:51,376 --> 00:04:56,236

It seems to be helping to mitigate that problem with bone density and muscle weakness.

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00:04:56,716 --> 00:05:02,896

And then of course we recently have come across an issue with eyes and vision changes in space

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00:05:02,896 --> 00:05:06,796

that we have gotten a little bit more detail understanding what's going on there.

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00:05:06,966 --> 00:05:11,526

As far as fluid shifting towards the, towards the head when gravity is not pulling it

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00:05:11,526 --> 00:05:15,646

down anymore, it seems to affect their fine structures of the eye

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00:05:16,146 --> 00:05:19,906

and produce potentially permanent changes in vision.

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00:05:20,396 --> 00:05:23,926

And so we've been using some instrumentation up there now that hasn't been up there before,

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00:05:24,496 --> 00:05:26,796

small size ultra-sonography to look at the eye.

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00:05:27,206 --> 00:05:31,756

There's also a very high level optical camera that we're going to be flying soon

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00:05:31,756 --> 00:05:34,076

that will be able to take a really good look at the back of the eye

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00:05:34,466 --> 00:05:36,156

and try to assess the issues there.

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00:05:36,606 --> 00:05:42,686

We think it could be, could be related to fluid shifting along with high salt diet that happens

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00:05:42,686 --> 00:05:45,036

to be on the space station due to the fact that the food has

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00:05:45,036 --> 00:05:47,366

to be preserved for a long time up there.

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00:05:47,796 --> 00:05:51,196

And maybe carbon dioxide levels may have something to do with it

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00:05:51,196 --> 00:05:52,576

and try to keep the carbon dioxide levels down.

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00:05:52,576 --> 00:05:54,796

There are a number of factors that were looking at up there

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00:05:54,796 --> 00:05:57,606

that may affect certain situations here on Earth.

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00:05:57,956 --> 00:05:58,926

[Josh] You mentioned exercise.

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00:05:59,096 --> 00:06:01,956

Have you guys seen a difference in,
you know, the crew members coming back?

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00:06:01,956 --> 00:06:06,126

I mean, Ed's one of the people that goes over to
Russia in Kazakhstan and we spent many an hour

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00:06:06,126 --> 00:06:09,736

on helicopters and the airplanes
going over there.

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00:06:09,736 --> 00:06:13,526

But have you guys seen a difference in,
now that you've got sort of a variety

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00:06:13,526 --> 00:06:14,806

of different exercise equipment up there,

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00:06:14,806 --> 00:06:17,386

the crew members exercise
quite a bit during the day,

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00:06:17,386 --> 00:06:20,886

do you see a difference now whenever they're
coming back and how their body is reacting?

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00:06:21,026 --> 00:06:21,796

[Powers] Yes, definitely.

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00:06:21,796 --> 00:06:25,596

Many of them are coming back even in a little
bit better shape than when they launched

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00:06:25,666 --> 00:06:28,686

because when they get a little distracted
the first, I mean the last month

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00:06:28,816 --> 00:06:31,476

or so before they launch and
sometimes exercise falls off.

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00:06:31,476 --> 00:06:35,216

And so when they get up there and they
have a concentrated exercise program,

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00:06:35,526 --> 00:06:40,056

daily exercise program, you know, at least an
hour of resistive exercise and at least an hour

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00:06:40,056 --> 00:06:44,636

of cardiovascular workout everyday
then sometimes they actually come back

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00:06:44,636 --> 00:06:45,956

in a little bit better shape.

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00:06:46,226 --> 00:06:49,376

Now I think we finally, over
the years and many crews,

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00:06:49,376 --> 00:06:52,066

I think we finally have got
the right approach to this.

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00:06:52,066 --> 00:06:55,646

And we've got the right exercise equipment
onboard and they're actually doing very well.

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00:06:55,926 --> 00:06:56,426

[Josh] That's good.

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00:06:56,426 --> 00:06:57,876

So talk a bit about your background.

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00:06:57,876 --> 00:06:59,026

I mean we get this question all the time.

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00:06:59,026 --> 00:07:00,116

How did you get the job at NASA?

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00:07:00,116 --> 00:07:04,206

So how do you go from medical school into being, being a flight surgeon.

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00:07:04,526 --> 00:07:07,556

[Powers] Well, I grew up in the Chicago area and so I went

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00:07:07,556 --> 00:07:09,946

to medical school at Rush University in Chicago.

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00:07:09,946 --> 00:07:12,756

And I was very interested in surgery and emergency medicine.

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00:07:12,816 --> 00:07:15,496

And so I did a postgraduate training program.

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00:07:15,496 --> 00:07:20,406

First a general surgery internship and then two additional years of emergency medicine

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00:07:20,406 --> 00:07:22,286

and became an emergency medicine specialist.

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00:07:22,846 --> 00:07:26,296

And it just so happens I've always had the fondness of flying.

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00:07:26,296 --> 00:07:29,326

I started flying when I was 15 with a friend's airplane.

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00:07:29,326 --> 00:07:32,976

And so I was trying to combine those different interests,

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00:07:33,046 --> 00:07:35,566

emergency medicine and flying and space program.

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00:07:35,566 --> 00:07:40,106

And wound up doing another residency program in aerospace medicine,

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00:07:40,216 --> 00:07:41,716

two year program in Dayton, Ohio.

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00:07:42,486 --> 00:07:44,906

And eventually wound up at NASA.

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00:07:45,186 --> 00:07:49,076

So I've been working as an emergency physician and an aerospace medicine physician

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00:07:49,076 --> 00:07:51,416

for much of the last 10 or 15 years.

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00:07:51,536 --> 00:07:52,736

[Josh] Is it still fascinating to you?

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00:07:52,896 --> 00:07:54,146

[Powers] Oh, yes very much so.

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00:07:54,506 --> 00:07:55,026

[Josh] Lots to learn.

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00:07:55,316 --> 00:07:56,806

Thanks for joining us Ed.

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00:07:56,806 --> 00:07:59,426

It's Dr. Ed Powers one of the flight surgeons here at NASA.

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00:07:59,426 --> 00:08:02,566

If you would like to learn more about
all these different types of experiments

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00:08:02,566 --> 00:08:05,736

that the crew is actually doing on a daily
basis about, you know, with their own bodies

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00:08:05,736 --> 00:08:09,196

and how the human body reacts to being in
space you can always log on the NASA website.

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00:08:09,196 --> 00:08:13,556

Just go to www.nasa.gov/station.

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00:08:13,556 --> 00:08:16,056

Just click on research and
take a look at Expedition 30.

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00:08:16,056 --> 00:08:16,746

So thanks again Ed.