1
00:00:01,090 --> 00:00:06,600
>> So today we're here at the exercise facility
where the astronauts come out and train on some

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00:00:06,600 --> 00:00:09,400
of the equipment that's onboard
the Space Station.

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00:00:09,400 --> 00:00:12,380
And here with me today we
have Lori Ploutz-Snyder.

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00:00:12,380 --> 00:00:16,880
She is the Lead Scientist for exercise
physiology and counter measures.

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00:00:16,880 --> 00:00:18,770
Welcome, Lisa, thank you for coming.

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00:00:18,770 --> 00:00:23,690
First of all we were going to talk to you a
little about a study that is currently ongoing.

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00:00:23,690 --> 00:00:28,380
I believe there -- it happened once,
started with the crew that is now down

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00:00:28,380 --> 00:00:31,360
and they're also participating
in this study now.

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00:00:31,360 --> 00:00:36,420
That study is called SPRINT and so first,
just talk to us a little about what SPRINT is.

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00:00:36,420 --> 00:00:38,700
Give us a brief overview if you will.

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00:00:38,700 --> 00:00:42,790

>> Lori Ploutz-Snyder: SPRINT is an exercise research study that looks

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00:00:42,790 --> 00:00:48,030
at integrated exercise program using aerobic and resistance exercise.

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00:00:48,030 --> 00:00:51,950
And we're trying to come up with the most efficient exercise prescription

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00:00:51,950 --> 00:00:56,640
to optimize the cardiovascular system, skeletal, muscle, and bone.

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00:00:56,640 --> 00:00:58,820
And it builds off of about two decades

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00:00:58,820 --> 00:01:05,060
of previous NASA research evaluating individual systems and for the first time it's trying

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00:01:05,060 --> 00:01:07,780
to bring together an integrated program

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00:01:07,780 --> 00:01:12,270
to develop the best counter measures for overall fitness.

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00:01:12,270 --> 00:01:13,360
>> That's a mouthful.

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00:01:13,360 --> 00:01:18,890
And so explain to me exactly what specifically is the crew doing.

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00:01:18,890 --> 00:01:20,970
What kind of activities are they doing that would be different

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00:01:20,970 --> 00:01:24,150
from what their normal exercise
program would be?

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00:01:24,150 --> 00:01:27,400
>> Lori Ploutz-Snyder: Yeah there are
two main parts to the SPRINT program.

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00:01:27,400 --> 00:01:32,770
The first part is a set of ground
based tests before and after flight

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00:01:32,770 --> 00:01:37,630
to provide a really thorough assessment of
the cardiovascular, muscle, and bone systems.

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00:01:37,630 --> 00:01:44,310
And so these include maximal aerobic testing,
different muscle power, muscle endurance,

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00:01:44,310 --> 00:01:50,600
muscle strength, a variety of muscle
performance tests, a muscle biopsy as well

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00:01:50,600 --> 00:01:53,940
as measurements for bone including QCT and DEXA.

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00:01:53,940 --> 00:01:55,510
And so with these measurements pre

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00:01:55,510 --> 00:02:01,350
and post-flight we'll get a really thorough
assessment of the crew's physiologic function.

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00:02:01,350 --> 00:02:05,670
And the second part of the study
employs an in-flight component

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00:02:05,670 --> 00:02:08,840

where they perform a new
exercise prescription on ISS.

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00:02:08,840 --> 00:02:12,000
They use all of the same ISS equipment

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00:02:12,000 --> 00:02:15,570
but the way the exercises are
prescribed is a little bit different.

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00:02:15,570 --> 00:02:21,980
So we include aerobic intervals and that's
how the study got its name, the SPRINT.

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00:02:21,980 --> 00:02:27,210
So they do some sprinting on the cycle and
the bicycle where they go at high intensity

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00:02:27,210 --> 00:02:30,480
for short bouts and then have a rest period.

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00:02:30,480 --> 00:02:37,130
And we also have resistance exercise on the ARED
[phonetic] that they perform three days a week.

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00:02:37,130 --> 00:02:41,760
>> Okay so currently the crew is
exercising two hours everyday.

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00:02:41,760 --> 00:02:43,490
Will that change with this experiment?

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00:02:43,490 --> 00:02:45,780
Are they resting anytime?

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00:02:45,780 --> 00:02:50,480
>> Lori Ploutz-Snyder: Yeah this experiment
is evaluating a higher intensity exercise

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00:02:50,480 --> 00:02:55,130
prescription that can be done for shorter
amounts of time and less frequently.

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00:02:55,130 --> 00:02:58,030
>> Now, so are they more worn out the next day?

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00:02:58,030 --> 00:03:01,960
They're going to have this rest time but they're
actually, basically what I'm hearing from you is

46
00:03:01,960 --> 00:03:03,960
that there's a more intense workout.

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00:03:03,960 --> 00:03:07,580
So is it problematic at all on the rest period?

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00:03:07,580 --> 00:03:10,830
>> Lori Ploutz-Snyder: Well so
far it's exceeded our expectations

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00:03:10,830 --> 00:03:15,100
but we've only had one person complete the study
but so far it seems to be working really well.

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00:03:15,100 --> 00:03:16,070
>> So so far we have positive data.

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00:03:16,070 --> 00:03:20,630
Now so one of the crew members who
actually did this study is down.

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00:03:20,630 --> 00:03:24,080
And we can't talk about personal
data but can you share with us

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00:03:24,080 --> 00:03:26,880
if there was positive data from that study?

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00:03:26,880 --> 00:03:31,870
>> Lori Ploutz-Snyder: Yeah he exceeded our
expectations and it went very well especially

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00:03:31,870 --> 00:03:35,520
for the first person both in
terms of the implementation.

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00:03:35,520 --> 00:03:39,490
There's a lot of new communications
necessary in this study.

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00:03:39,490 --> 00:03:44,190
One of the things I didn't mention
before is that another novel part

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00:03:44,190 --> 00:03:48,890
of this study is we evaluate how they're
doing during their whole mission.

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00:03:48,890 --> 00:03:56,130
So every 30 days they perform VO2 Max [phonetic]
which tests the maximal aerobic capacity.

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00:03:56,130 --> 00:03:58,890
>> That's that thing Lance
Armstrong is really good at, correct?

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00:03:58,890 --> 00:03:59,990
>> Lori Ploutz-Snyder: That's right.

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00:03:59,990 --> 00:04:00,310
>> Right.

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00:04:00,310 --> 00:04:01,920
>> Lori Ploutz-Snyder: One of the things.

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00:04:01,920 --> 00:04:07,700
[Chuckles] And we test that every 30 days so
that we can keep an eye on their aerobic fitness

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00:04:07,700 --> 00:04:11,550
and then we can adjust the
prescription as necessary up

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00:04:11,550 --> 00:04:13,630
or down depending how they're doing.

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00:04:13,630 --> 00:04:18,120
We also have the first time
measurements on ISS of muscle ultrasound.

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00:04:18,120 --> 00:04:24,110
So we're using the new ultrasound system to
make measurements of the leg muscle size.

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00:04:24,110 --> 00:04:29,270
And the crew members scan themselves and
make measurements of their own muscle size.

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00:04:29,270 --> 00:04:35,370
And we compare that with the loads they're doing
on ARED to determine how well they're doing

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00:04:35,370 --> 00:04:39,510
for the resistance exercise and we can
adjust the prescription accordingly.

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00:04:39,510 --> 00:04:43,210
And so this involved a lot of new
implementation of communications

73
00:04:43,210 --> 00:04:46,130
to get this data quickly and coordinated.

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00:04:46,130 --> 00:04:50,730
So both from the implementation standpoint
and from the performance standpoint,

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00:04:50,730 --> 00:04:53,550
our first subject was a great success.

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00:04:53,550 --> 00:04:54,080
>> Awesome.

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00:04:54,080 --> 00:04:57,660
Well so first -- let's just go ahead and talk
about some of this equipment that we have.

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00:04:57,660 --> 00:04:59,640
I understand there are three main pieces.

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00:04:59,640 --> 00:05:01,460
We have one right here behind us.

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00:05:01,460 --> 00:05:05,360
This is the advanced resistive
exercise device and what other pieces

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00:05:05,360 --> 00:05:07,500
of equipment are you using during this study?

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00:05:07,500 --> 00:05:10,550
>> Lori Ploutz-Snyder: So all of our
resistance exercises are performed on the ARED

83
00:05:10,550 --> 00:05:13,070
or the advanced resistance exercise device.

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00:05:13,070 --> 00:05:17,800
There's also a treadmill and a
cycle up on the Space Station

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00:05:17,800 --> 00:05:24,860
and in the SPRINT program the participants
exercise on both of those at least two-thirds

86
00:05:24,860 --> 00:05:27,060

of their aerobic exercise on the treadmill.

87
00:05:27,060 --> 00:05:27,700
>> Okay.

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00:05:27,700 --> 00:05:29,790
>> Lori Ploutz-Snyder: So a
little more treadmill than cycle.

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00:05:29,790 --> 00:05:30,860
>> Okay great.

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00:05:30,860 --> 00:05:34,440
So I know -- we know what the
cycle is and a treadmill is

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00:05:34,440 --> 00:05:39,320
but the advanced resistive exercise
device basically is a piece of equipment

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00:05:39,320 --> 00:05:41,520
that simulates weightlessness here on earth.