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00:00:00,960 --> 00:00:02,890

>> So we're back here in the exercise facility.

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00:00:02,890 --> 00:00:05,910

We're here at the Johnson Space Center where the astronauts train

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00:00:05,910 --> 00:00:08,860

on the equipment that's onboard the international space station.

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00:00:08,860 --> 00:00:13,590

Here I am on the ARED, which is also called the advanced resistive exercise device,

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00:00:13,590 --> 00:00:17,350

this piece of machine, it looks like behemoth and is very intimidating.

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00:00:17,350 --> 00:00:22,520

I'm actually going to attempt it, but it is a what simulates weight lifting here on earth

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00:00:22,520 --> 00:00:27,050

and so here with me today is Bob Tweedy, he's one of the trainers, one of the three trainers

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00:00:27,050 --> 00:00:29,330

that trains the astronauts on how to use all

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00:00:29,330 --> 00:00:31,500

of the equipment that's onboard the international space station.

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00:00:31,500 --> 00:00:32,250

Welcome, Bob.

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00:00:32,250 --> 00:00:32,990

>> Thank you.

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00:00:32,990 --> 00:00:34,270

>> So let's get to it.

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00:00:34,270 --> 00:00:38,070

We're going to go first into one of the exercises.

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00:00:38,070 --> 00:00:40,320

There's many exercises that we can do on this, correct?

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00:00:40,320 --> 00:00:40,800

>> That's correct.

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00:00:40,800 --> 00:00:42,840

>> So we're going to start with some leg exercises.

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00:00:42,840 --> 00:00:46,260

We're going to go with a squat because I'm daring like that.

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00:00:46,260 --> 00:00:50,760

And we're going to go here, first I want to Bob to explain to us a little about how this works

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00:00:50,760 --> 00:00:53,740

because obviously in space, you, you're not going to feel weight.

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00:00:53,740 --> 00:00:59,260

So I'm actually going to adjust the load and he's going to explain how this works.

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00:00:59,260 --> 00:01:02,630

>> So what you're doing here is adjusting the load.

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00:01:02,630 --> 00:01:07,390

This is a zero gravity weight lifting machine that can provide up to 600 periods

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00:01:07,390 --> 00:01:10,200

of resistance when you use the lift bar.

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00:01:10,200 --> 00:01:14,610

It can also provide an additional 150 pounds of resistance if you use the,

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00:01:14,610 --> 00:01:17,990

the cable and I think you're going to demonstrate some of that as well.

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00:01:17,990 --> 00:01:22,170

The load is provided two cylinders that contain a vacuum,

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00:01:22,170 --> 00:01:25,610

so you're constantly pushing and pulling against the vacuum.

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00:01:25,610 --> 00:01:30,200

>> Okay. And emphasis on zero 'cause I just put it down to zero.

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00:01:31,750 --> 00:01:33,280

>> Okay.

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00:01:33,280 --> 00:01:36,340

>> All right.

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00:01:36,340 --> 00:01:40,080

>> So go ahead and get under the bar and just position, position yourself for the squat.

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00:01:40,080 --> 00:01:42,160

>> Okay. And we're going to take it off the rack?

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00:01:42,160 --> 00:01:42,870

>> Take it off the rack.

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00:01:42,870 --> 00:01:43,440

>> All right.

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00:01:43,440 --> 00:01:44,820

>> Stand up.

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00:01:44,820 --> 00:01:49,530

Slide your feet back just a tad and you are ready to go.

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00:01:49,530 --> 00:01:50,280

[Background noise]

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00:01:50,280 --> 00:01:53,580

>> Very good lift.

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00:01:55,140 --> 00:01:58,900

>> Actually this is -- it's work.

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00:01:58,900 --> 00:02:01,450

I can feel it.

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00:02:01,450 --> 00:02:02,620

I feel the burn.

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00:02:02,620 --> 00:02:08,810

So can you tell me, does this feel any different here, as it does in space?

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00:02:08,810 --> 00:02:10,300

Does it feel the same, do you know?

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00:02:10,300 --> 00:02:15,950

>> Well, having not been in space, I can't

tell you exactly, but the load is constant,

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00:02:15,950 --> 00:02:20,520

just like free weights would
be on the ground or in the gym.

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00:02:20,520 --> 00:02:24,700

The, the crew members would
dial in a load that, you know,

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00:02:24,700 --> 00:02:27,150

would be appropriate per their prescription

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00:02:27,150 --> 00:02:30,470

and they're coming back in
really, really good shape.

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00:02:30,470 --> 00:02:34,570

So we like the, we like the
effects of this machine.

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00:02:34,570 --> 00:02:37,560

>> And so typically, how many
do they do -- reps, sets?

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00:02:37,560 --> 00:02:40,850

>> Oh, they'll, they'll do
[inaudible] yeah, you can go ahead

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00:02:40,850 --> 00:02:45,570

and rack it forward and then down and then good.

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00:02:46,850 --> 00:02:47,630

>> So typically how...

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00:02:47,630 --> 00:02:49,620

>> They'll, they'll do 3 sets, 3 sets

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00:02:49,620 --> 00:02:53,200

of 10 is probably the standard,
but it could 4 sets of 12.

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00:02:53,200 --> 00:02:59,870
It could be 3 sets of 6, it all depends on if
they're doing a heavy day, a medium weight day,

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00:02:59,870 --> 00:03:03,490
or, or maybe a light day with more repetitions,
so there's some variation [inaudible]

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00:03:03,490 --> 00:03:03,560
[Inaudible]

59
00:03:03,560 --> 00:03:07,300
>> Okay. So it just depends on the astronaut
and what his or her prescription is.

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00:03:07,300 --> 00:03:08,700
>> Right. Exactly right.

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00:03:08,700 --> 00:03:09,340
>> Okay. Great.

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00:03:09,340 --> 00:03:13,060
So talk to me a little about what exercise,
we'll go ahead and break this down, if you will

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00:03:13,060 --> 00:03:16,300
and we'll get ready to do some arm
exercises, but tell me a little more

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00:03:16,300 --> 00:03:18,510
about the different exercises
that we can do with this machine.

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00:03:18,510 --> 00:03:22,800
>> You can do pretty much anything on this
machine that, that you can do on the ground.

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00:03:22,800 --> 00:03:27,960

The big, the big lifts that we focus on are, are squats, which you just did.

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00:03:27,960 --> 00:03:36,480

We can do heel raises, dead lifts and a wide variety of cable exercises.

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00:03:36,480 --> 00:03:40,110

There's also a bench that we can attach to the platform.

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00:03:40,110 --> 00:03:41,070

>> Are you cranking it up?

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00:03:41,070 --> 00:03:42,490

>> I'm cranking it up 'cause...

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00:03:42,490 --> 00:03:43,570

>> You're killing me, Smalls.

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00:03:43,570 --> 00:03:44,510

>> You, you need to do this.

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00:03:44,510 --> 00:03:45,860

>> I know.

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00:03:45,860 --> 00:03:47,460

All right.

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00:03:47,460 --> 00:03:51,470

>> So there's, there's an exercise bench that can be attached to the platform and you can lay

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00:03:51,470 --> 00:03:54,430

on the bench and you can do, you know, your typical bench press.

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00:03:54,430 --> 00:03:55,380

>> Your typical bench press.

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00:03:55,380 --> 00:03:59,400

>> You can sit on the bench and do presses, overhead presses.

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00:03:59,400 --> 00:04:04,390

So a wide variety of exercises that you can do and, and the great thing is is

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00:04:04,390 --> 00:04:05,900

that the load is a constant load.

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00:04:05,900 --> 00:04:06,200

So.

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00:04:06,200 --> 00:04:06,610

>> Interesting.

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00:04:06,610 --> 00:04:09,350

So, a lot of these exercises, are they all isolated,

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00:04:09,350 --> 00:04:12,970

are there any complex exercises that can be done?

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00:04:12,970 --> 00:04:17,090

>> We, we try not to get too complex with the machine because isolation,

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00:04:17,090 --> 00:04:18,670

what you said, is, is really important.

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00:04:18,670 --> 00:04:22,130

When you exercise on the machine, the machine basically free floats away

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00:04:22,130 --> 00:04:29,100

from the station structured on a, on a system
of rails and you can excite that system

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00:04:29,100 --> 00:04:35,670

if you do certain lifts and the reason why
it free floats while you're using it is

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00:04:35,670 --> 00:04:38,920

because you don't want any
forces that you produce as a,

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00:04:38,920 --> 00:04:42,240

as a user to be transmitted
into the structure station.

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00:04:42,240 --> 00:04:43,180

>> Okay. Great.

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00:04:43,180 --> 00:04:44,570

So what are we going to do first?

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00:04:44,570 --> 00:04:46,990

>> You're going, you're going to do bicep curls.

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00:04:46,990 --> 00:04:47,450

>> All right.

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00:04:47,450 --> 00:04:50,810

I'm ready.

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00:04:50,810 --> 00:04:54,010

>> [inaudible] the cable.

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00:04:54,010 --> 00:04:57,640

>> And so which exercises do they
do daily, [inaudible] as opposed

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00:04:57,640 --> 00:05:00,350

to which ones they do just, you know [inaudible]

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00:05:00,350 --> 00:05:05,650

>> Right. Every day, they'll do some form of squat, like the regular squat that you just did,

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00:05:05,650 --> 00:05:09,340

then they do a squat, squat with a wide stance.

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00:05:09,340 --> 00:05:12,840

A wide stance squat and they can do a single leg squat.

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00:05:12,840 --> 00:05:17,010

>> Okay. And so they're different variations of the, of each exercise as well.

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00:05:17,010 --> 00:05:17,300

>> That's right.

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00:05:17,300 --> 00:05:22,230

>> And I understand that the lower body exercise is pretty important significantly for,

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00:05:22,230 --> 00:05:24,760

for astronauts on the space station, and why is that?

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00:05:24,760 --> 00:05:30,080

>> Well, bone loss, as, as a lot of people know is a huge issue.

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00:05:30,080 --> 00:05:36,740

We see the susceptible areas are the, the hip area and lifts like squats,

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00:05:36,740 --> 00:05:42,850

dead lifts really provide good loading to those problematic areas.

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00:05:42,850 --> 00:05:48,560

And so you'll see typically crew members
do some form of squat or some form

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00:05:48,560 --> 00:05:51,220

of dead lift pretty much every day.

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00:05:51,220 --> 00:05:55,690

And those are typically high load, they'll crank
the load up pretty high when they do those two.

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00:05:55,690 --> 00:05:56,640

>> Okay.

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00:05:56,640 --> 00:05:59,810

>> Now you can go ahead [inaudible]
just switch over your grip

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00:05:59,810 --> 00:06:02,060

and then put your hands relatively
close together

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00:06:02,060 --> 00:06:05,340

and then you can kind of go
up and do an upright row.

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00:06:05,340 --> 00:06:06,760

>> And this is working out what?

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00:06:06,760 --> 00:06:10,070

>> 'Kay. Stand a little bit
closer and stand up straight.

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00:06:10,070 --> 00:06:14,480

And here, you're going to come straight up
and you should feel it in the shoulders.

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00:06:14,480 --> 00:06:16,380

>> That's where I'm feeling it.

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00:06:17,910 --> 00:06:18,870

And so what else can we do this?

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00:06:18,870 --> 00:06:19,210

>> Okay.

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00:06:19,210 --> 00:06:22,210

>> We can do several exercises with just this bar even.

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00:06:22,210 --> 00:06:22,910

>> Absolutely.

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00:06:22,910 --> 00:06:27,760

Another one you can do is you can widen your grip just a little bit, bend over at the waist

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00:06:27,760 --> 00:06:34,530

with a straight back and then just row that bar right into your stomach and you can,

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00:06:34,530 --> 00:06:38,650

you can get the muscles in the, in your back, upper back.

128

00:06:40,030 --> 00:06:41,240

>> Well, I'm definitely feeling the burn.

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00:06:41,240 --> 00:06:47,670

And you know, I have to, I have to wonder and I don't know if you've been able to talk with any

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00:06:47,670 --> 00:06:52,650

of [inaudible] on the, on the [inaudible] and so I don't know if you guys talked,

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00:06:52,650 --> 00:06:55,420

talk with any of the crew members on -- that --

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00:06:55,420 --> 00:06:59,990

who have done this and if this is kind of
welcome feeling in space when you're, you know,

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00:06:59,990 --> 00:07:04,630

in microgravity to actually kind of
feel some kind of weight up there.

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00:07:04,630 --> 00:07:09,350

>> Yeah. Everyone that I've talked to,
and that's about all of them, really,

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00:07:09,350 --> 00:07:12,180

really enjoy the time they have
with this machine on station.

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00:07:12,180 --> 00:07:17,850

You know how good it feels, or how
good you feel after a good workout?

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00:07:17,850 --> 00:07:22,650

You seem to be more energized, have
time to do other things, they love it,