1
00:00:03,909 --> 00:00:02,310
we often talk about new and ongoing

2
00:00:05,190 --> 00:00:03,919
experiments onboard the station but

3
00:00:07,030 --> 00:00:05,200
today we're going to talk about one

4
00:00:09,190 --> 00:00:07,040
that's complete and now providing some

5
00:00:11,270 --> 00:00:09,200
interesting results laurie meings at the

6
00:00:12,549 --> 00:00:11,280
payload operations integration center at

7
00:00:14,549 --> 00:00:12,559
the marshall space flight center in

8
00:00:16,790 --> 00:00:14,559
huntsville alabama is going to tell us

9
00:00:18,630 --> 00:00:16,800
more about the integrated cardiovascular

10
00:00:22,230 --> 00:00:18,640
experiment

11
00:00:25,029 --> 00:00:22,240
was recently named one of the most

12
00:00:26,950 --> 00:00:25,039
compelling studies from the iss today we

13
00:00:29,189 --> 00:00:26,960

learn more about this study and how the

14
00:00:32,310 --> 00:00:29,199
results are already helping folks here

15
00:00:36,229 --> 00:00:33,990
so the integrated cardiovascular study

16
00:00:37,350 --> 00:00:36,239
was one done to look at the long-term

17
00:00:39,430 --> 00:00:37,360
effects of

18
00:00:41,430 --> 00:00:39,440
space flight on heart

19
00:00:43,350 --> 00:00:41,440
size heart function

20
00:00:45,830 --> 00:00:43,360
and how those interplay with the risk

21
00:00:48,310 --> 00:00:45,840
for cardiac arrhythmias

22
00:00:50,310 --> 00:00:48,320
why was it important to study this in

23
00:00:51,350 --> 00:00:50,320
space yeah it was important because we

24
00:00:53,430 --> 00:00:51,360
know from

25
00:00:55,029 --> 00:00:53,440
ground-based analogs for space flight

26
00:00:57,029 --> 00:00:55,039
bed rest studies

27
00:00:58,869 --> 00:00:57,039
and some flight studies that the heart

28
00:01:00,630 --> 00:00:58,879
tends to get smaller

29
00:01:02,069 --> 00:01:00,640
with less activity

30
00:01:03,990 --> 00:01:02,079
you know in the past the countermeasures

31
00:01:05,990 --> 00:01:04,000
in space weren't as good and astronauts

32
00:01:07,910 --> 00:01:06,000
hearts would shrink the muscle would get

33
00:01:09,190 --> 00:01:07,920
smaller the heart is muscle and like any

34
00:01:10,950 --> 00:01:09,200
other muscle the more you work it the

35
00:01:12,870 --> 00:01:10,960
bigger it gets and the less you work it

36
00:01:14,230 --> 00:01:12,880
the more it atrophies

37
00:01:16,550 --> 00:01:14,240
so the astronauts hearts would get

38
00:01:19,350 --> 00:01:16,560

smaller the volume in the hearts would

39
00:01:21,270 --> 00:01:19,360
get smaller and there was one report of

40
00:01:22,789 --> 00:01:21,280
a cardiac arrhythmia on an astronaut who

41
00:01:25,270 --> 00:01:22,799
was on the mirror space station about

42
00:01:27,830 --> 00:01:25,280
two months into his stay so the concern

43
00:01:30,310 --> 00:01:27,840
was that these changes in heart function

44
00:01:32,310 --> 00:01:30,320
and size could lead to possible

45
00:01:33,990 --> 00:01:32,320
arrhythmias and

46
00:01:36,469 --> 00:01:34,000
besides just the arrhythmias lead to

47
00:01:37,270 --> 00:01:36,479
problems when you land from space you

48
00:01:38,870 --> 00:01:37,280
know

49
00:01:41,510 --> 00:01:38,880
spending six months in space going from

50
00:01:43,830 --> 00:01:41,520
earth to mars landing having to function

51
00:01:45,510 --> 00:01:43,840
especially in an emergency situation is

52
00:01:47,429 --> 00:01:45,520
very important

53
00:01:49,590 --> 00:01:47,439
the study had 13 astronauts four of them

54
00:01:51,830 --> 00:01:49,600
women they came from expedition 20 all

55
00:01:53,429 --> 00:01:51,840
the way through expedition 34. there was

56
00:01:55,510 --> 00:01:53,439
a lot of pre-work for this bed rest

57
00:01:58,230 --> 00:01:55,520
studies where we had patients spend five

58
00:02:00,310 --> 00:01:58,240
weeks in bed do supine cycling

59
00:02:03,030 --> 00:02:00,320
rowing orgometry all these things versus

60
00:02:06,310 --> 00:02:03,040
controls looking at exercise changes

61
00:02:08,790 --> 00:02:06,320
with heart function and muscle thickness

62
00:02:10,949 --> 00:02:08,800
so i know you have results now but i'm

63
00:02:12,790 --> 00:02:10,959

kind of curious you had four women

64
00:02:13,910 --> 00:02:12,800
the rest men were there any difference

65
00:02:15,589 --> 00:02:13,920
there

66
00:02:17,270 --> 00:02:15,599
you know so far we haven't really seen a

67
00:02:19,430 --> 00:02:17,280
difference between the men and women but

68
00:02:22,470 --> 00:02:19,440
it's not a large number of either and so

69
00:02:24,390 --> 00:02:22,480
it's hard to say that we've had enough

70
00:02:26,710 --> 00:02:24,400
to find that difference but i think

71
00:02:28,710 --> 00:02:26,720
important that in what we've seen

72
00:02:30,150 --> 00:02:28,720
it looks about the same interestingly

73
00:02:31,990 --> 00:02:30,160
heart function

74
00:02:34,390 --> 00:02:32,000
before and after four to six months of

75
00:02:35,990 --> 00:02:34,400
spaceflight really stays the same

76
00:02:38,229 --> 00:02:36,000
there's no change in how well the heart

77
00:02:39,670 --> 00:02:38,239
squeezes how much blood it pumps how

78
00:02:41,030 --> 00:02:39,680
thick the muscle gets and i think that

79
00:02:42,630 --> 00:02:41,040
really speaks to how well the

80
00:02:44,550 --> 00:02:42,640
countermeasure is on the space station

81
00:02:46,790 --> 00:02:44,560
right now and they have two hours of

82
00:02:48,470 --> 00:02:46,800
exercise time built into the system not

83
00:02:49,430 --> 00:02:48,480
sure that it's always done but it what

84
00:02:51,990 --> 00:02:49,440
they do

85
00:02:53,270 --> 00:02:52,000
seems to be very effective

86
00:02:55,589 --> 00:02:53,280
what do you hope

87
00:02:56,790 --> 00:02:55,599
comes from this experiment what should

88
00:02:58,470 --> 00:02:56,800

come out of that and why should people

89
00:03:00,390 --> 00:02:58,480
on earth care about it the two things

90
00:03:01,350 --> 00:03:00,400
that i'm most concerned into this study

91
00:03:03,589 --> 00:03:01,360
is

92
00:03:05,830 --> 00:03:03,599
long duration space flight and if we go

93
00:03:07,509 --> 00:03:05,840
through with interplanetary travel

94
00:03:09,910 --> 00:03:07,519
near earth objects

95
00:03:12,070 --> 00:03:09,920
than to make sure that the heart isn't

96
00:03:14,390 --> 00:03:12,080
compromised in such a way over

97
00:03:16,390 --> 00:03:14,400
six months in space that that the

98
00:03:18,630 --> 00:03:16,400
astronaut can't function when they land

99
00:03:20,550 --> 00:03:18,640
and i think that's very important

100
00:03:22,710 --> 00:03:20,560
besides that there are some

101
00:03:23,670 --> 00:03:22,720
results that are relevant to earth right

102
00:03:25,270 --> 00:03:23,680
now

103
00:03:26,869 --> 00:03:25,280
for example one of them is athletes the

104
00:03:28,710 --> 00:03:26,879
way the athlete heart changes with

105
00:03:29,670 --> 00:03:28,720
exercise training and when they stop

106
00:03:31,350 --> 00:03:29,680
training

107
00:03:33,110 --> 00:03:31,360
is very relevant to the information we

108
00:03:35,030 --> 00:03:33,120
get from the space station and vice

109
00:03:36,949 --> 00:03:35,040
versa we're learning constantly more

110
00:03:39,910 --> 00:03:36,959
things about it that we can apply to

111
00:03:41,910 --> 00:03:39,920
athletes who come in with heart problems

112
00:03:43,509 --> 00:03:41,920
in the same way there's a

113
00:03:45,350 --> 00:03:43,519

population of patients who have

114
00:03:47,750 --> 00:03:45,360
something called potts disease postural

115
00:03:49,670 --> 00:03:47,760
orthostatic tachycardia syndrome and

116
00:03:51,830 --> 00:03:49,680
these are mostly women

117
00:03:53,990 --> 00:03:51,840
they're young usually and they have

118
00:03:56,550 --> 00:03:54,000
difficulty standing upright for very

119
00:03:58,710 --> 00:03:56,560
long periods of time

120
00:04:00,149 --> 00:03:58,720
historically they've exercised a lot and

121
00:04:02,229 --> 00:04:00,159
then something happens and they stop

122
00:04:04,229 --> 00:04:02,239
they get pregnant they get injured and

123
00:04:06,070 --> 00:04:04,239
when they stop exercising their hearts

124
00:04:07,429 --> 00:04:06,080
shrink just like we worry about in the

125
00:04:09,429 --> 00:04:07,439
astronauts

126
00:04:10,710 --> 00:04:09,439
well using the exercise program we

127
00:04:12,550 --> 00:04:10,720
developed in bed rest and have been

128
00:04:14,070 --> 00:04:12,560
using to help the astronauts on the

129
00:04:15,830 --> 00:04:14,080
space station we made an exercise

130
00:04:17,749 --> 00:04:15,840
program for these pots patients and it

131
00:04:19,590 --> 00:04:17,759
has

132
00:04:20,629 --> 00:04:19,600
been a great cure for many of the

133
00:04:21,670 --> 00:04:20,639
patients

134
00:04:23,430 --> 00:04:21,680
and

135
00:04:24,629 --> 00:04:23,440
very pleased with the outcome of that

136
00:04:26,950 --> 00:04:24,639
the exercise is able to make their

137
00:04:28,629 --> 00:04:26,960
hearts larger make them stronger and now

138
00:04:30,870 --> 00:04:28,639

they're able to lead more

139
00:04:33,590 --> 00:04:30,880
normal realistic lives

140
00:04:34,950 --> 00:04:33,600
so how does the common everyday person

141
00:04:36,950 --> 00:04:34,960
learn about these countermeasures learn

142
00:04:38,230 --> 00:04:36,960
about the exercise programs

143
00:04:39,909 --> 00:04:38,240
i think part of the outreach of this is

144
00:04:41,430 --> 00:04:39,919
for specifically the pots program there

145
00:04:43,830 --> 00:04:41,440
are a few national centers that really

146
00:04:45,749 --> 00:04:43,840
focus on potts patients but besides that

147
00:04:48,310 --> 00:04:45,759
i think an important idea is that

148
00:04:50,469 --> 00:04:48,320
exercise is beneficial for anybody who's

149
00:04:53,110 --> 00:04:50,479
aging healthy aging

150
00:04:54,230 --> 00:04:53,120
population needs to be exercising we

151
00:04:55,830 --> 00:04:54,240
know that

152
00:04:57,510 --> 00:04:55,840
the amount of fitness somebody has in

153
00:04:59,590 --> 00:04:57,520
mid-life really relates to long-term

154
00:05:00,710 --> 00:04:59,600
mortality and the kind of exercise the

155
00:05:02,469 --> 00:05:00,720
astronauts are doing on the space

156
00:05:05,270 --> 00:05:02,479
station keeps their hearts strong and

157
00:05:07,189 --> 00:05:05,280
flexible and young and if everybody

158
00:05:09,430 --> 00:05:07,199
can start to move that way then

159
00:05:13,510 --> 00:05:09,440
people will be more functional as they

160
00:05:15,029 --> 00:05:13,520
age happier as they age feel better

161
00:05:16,950 --> 00:05:15,039
so i better get out of here as quick as

162
00:05:18,790 --> 00:05:16,960
i can and go for a run you're taking a

163
00:05:20,230 --> 00:05:18,800

live look now at the payload operations

164
00:05:21,350 --> 00:05:20,240
integration center busy at work this

165
00:05:22,469 --> 00:05:21,360
morning helping with some of those

166
00:05:24,150 --> 00:05:22,479
robonaut

167
00:05:25,430 --> 00:05:24,160
activities and anything else that the