
NASA
SPACESTATION
LIVE

1
00:00:09,110 --> 00:00:07,110
a lot of important research to support

2
00:00:11,190 --> 00:00:09,120
future deep space exploration is

3
00:00:13,749 --> 00:00:11,200
underway on the international space

4
00:00:15,829 --> 00:00:13,759
station now with the one-year mission

5
00:00:19,269 --> 00:00:15,839
crew members scott kelly and mikhail

6
00:00:20,950 --> 00:00:19,279
konienko as scientists work to learn

7
00:00:22,230 --> 00:00:20,960
what it will take to support crews that

8
00:00:25,349 --> 00:00:22,240
one day will

9
00:00:29,189 --> 00:00:25,359
venture far beyond low earth orbit an

10
00:00:31,509 --> 00:00:29,199
investigation known as sleep iss 12 a

11
00:00:33,270 --> 00:00:31,519
follow-up to research on a previous

12
00:00:35,830 --> 00:00:33,280
station missions as well as space

13
00:00:37,830 --> 00:00:35,840

shuttle missions focuses on the quality

14
00:00:39,670 --> 00:00:37,840
and the quantity of sleep for the crew

15
00:00:41,750 --> 00:00:39,680
members and how that impacts their

16
00:00:43,510 --> 00:00:41,760
health and performance this morning

17
00:00:46,389 --> 00:00:43,520
we're going to learn more about that

18
00:00:48,790 --> 00:00:46,399
from the principal investigator dr laura

19
00:00:49,830 --> 00:00:48,800
barger of the harvard medical school and

20
00:00:52,549 --> 00:00:49,840
brigham

21
00:00:54,709 --> 00:00:52,559
and women's hospital in boston

22
00:00:55,510 --> 00:00:54,719
good morning laura thank you for joining

23
00:00:57,750 --> 00:00:55,520
us

24
00:00:59,750 --> 00:00:57,760
good morning thanks for having me

25
00:01:01,990 --> 00:00:59,760
well let's just start with uh this this

26
00:01:04,469 --> 00:01:02,000
sleep can you i mean obviously we all

27
00:01:06,469 --> 00:01:04,479
need sleep right here on earth but um

28
00:01:08,789 --> 00:01:06,479
explain to me why is this important to

29
00:01:10,469 --> 00:01:08,799
learn about the quality and the quantity

30
00:01:12,390 --> 00:01:10,479
of sleep that the astronauts are getting

31
00:01:14,870 --> 00:01:12,400
there in space

32
00:01:16,950 --> 00:01:14,880
well because sleep is so important it's

33
00:01:20,390 --> 00:01:16,960
it like you said it's important for

34
00:01:23,030 --> 00:01:20,400
everyone sleep deficiency here on earth

35
00:01:25,590 --> 00:01:23,040
leads to negative health and performance

36
00:01:28,469 --> 00:01:25,600
and safety consequences

37
00:01:31,069 --> 00:01:28,479
sleep is a biological need

38
00:01:33,270 --> 00:01:31,079

it can't be overcome by training or

39
00:01:36,789 --> 00:01:33,280
professionalism or having the right

40
00:01:41,270 --> 00:01:36,799
stuff in general adults need to sleep

41
00:01:43,030 --> 00:01:41,280
seven to nine hours per night and um

42
00:01:46,069 --> 00:01:43,040
as the us population everyone is

43
00:01:48,230 --> 00:01:46,079
sleeping less now than they used to 50

44
00:01:51,270 --> 00:01:48,240
years ago only three percent of the

45
00:01:55,270 --> 00:01:51,280
population was sleeping six hours a

46
00:01:57,510 --> 00:01:55,280
night or less and now 30 of us adults

47
00:01:59,590 --> 00:01:57,520
report sleeping

48
00:02:02,469 --> 00:01:59,600
less than six hours a night and that's

49
00:02:06,310 --> 00:02:02,479
44 when you look at night shift workers

50
00:02:08,150 --> 00:02:06,320
so sleep deficiency is a big problem um

51
00:02:10,949 --> 00:02:08,160
like i said it impairs your health and

52
00:02:13,990 --> 00:02:10,959
it prepares your performance and your

53
00:02:16,390 --> 00:02:14,000
mood uh your productivity so obviously

54
00:02:19,350 --> 00:02:16,400
for the astronauts up in space who have

55
00:02:24,150 --> 00:02:19,360
to perform well all the time have to be

56
00:02:26,070 --> 00:02:24,160
very productive sleep deficiency is um

57
00:02:28,070 --> 00:02:26,080
would would not be a good thing to have

58
00:02:32,070 --> 00:02:28,080
in space and they need to get a

59
00:02:33,750 --> 00:02:32,080
sufficient quantity and quality of sleep

60
00:02:35,270 --> 00:02:33,760
well thank you so much for that i i can

61
00:02:37,110 --> 00:02:35,280
certainly understand i don't think

62
00:02:39,110 --> 00:02:37,120
performance perform as well here on

63
00:02:40,470 --> 00:02:39,120

earth when i don't have enough sleep can

64
00:02:42,470 --> 00:02:40,480
you tell me i understand you've been

65
00:02:44,790 --> 00:02:42,480
doing this study since back on the

66
00:02:46,390 --> 00:02:44,800
shuttle mission so what have we learned

67
00:02:50,070 --> 00:02:46,400
so far

68
00:02:52,869 --> 00:02:50,080
well we we have been studying sleep for

69
00:02:55,990 --> 00:02:52,879
10 years we monitored the sleep of

70
00:02:57,430 --> 00:02:56,000
shuttle astronauts and astronauts on the

71
00:03:01,030 --> 00:02:57,440
iss

72
00:03:04,790 --> 00:03:01,040
so we had 80 crew members on shuttle

73
00:03:07,030 --> 00:03:04,800
missions and 21 iss crew members

74
00:03:10,229 --> 00:03:07,040
participate in our study

75
00:03:14,149 --> 00:03:10,239
and we found that the sleep on the

76
00:03:17,670 --> 00:03:14,159
shuttle was about six hours per night

77
00:03:19,910 --> 00:03:17,680
and what was most interesting i think as

78
00:03:21,190 --> 00:03:19,920
before we undertook the study we had

79
00:03:25,030 --> 00:03:21,200
thought that

80
00:03:27,430 --> 00:03:25,040
sleep was restricted on shuttle missions

81
00:03:30,309 --> 00:03:27,440
but on iss we had heard that people

82
00:03:32,550 --> 00:03:30,319
adapt and would sleep more and what we

83
00:03:36,070 --> 00:03:32,560
found was that on the

84
00:03:39,430 --> 00:03:36,080
uh station missions the astronauts um

85
00:03:41,110 --> 00:03:39,440
crew members only slept about 10 minutes

86
00:03:43,110 --> 00:03:41,120
more than they did on the shuttle

87
00:03:46,789 --> 00:03:43,120
missions

88
00:03:48,550 --> 00:03:46,799

so so that was a a surprise uh to us

89
00:03:50,550 --> 00:03:48,560
that we thought that they would be

90
00:03:52,470 --> 00:03:50,560
sleeping more on the longer duration

91
00:03:55,110 --> 00:03:52,480
missions and those missions

92
00:03:57,270 --> 00:03:55,120
averaged about six months

93
00:03:59,589 --> 00:03:57,280
do you have a hypothesis for

94
00:04:02,630 --> 00:03:59,599
what would happen for a person who is in

95
00:04:04,630 --> 00:04:02,640
space for an entire full year

96
00:04:06,630 --> 00:04:04,640
well that's going to be very interesting

97
00:04:09,750 --> 00:04:06,640
and um

98
00:04:12,309 --> 00:04:09,760
we don't know will people learn uh or be

99
00:04:14,309 --> 00:04:12,319
able to adapt are the schedules going to

100
00:04:17,349 --> 00:04:14,319
be different

101
00:04:19,590 --> 00:04:17,359
on the six month missions there were a

102
00:04:21,509 --> 00:04:19,600
lot of um

103
00:04:24,629 --> 00:04:21,519
during the time period where we studied

104
00:04:26,469 --> 00:04:24,639
the shuttle was coming up frequently

105
00:04:29,909 --> 00:04:26,479
there were other

106
00:04:31,110 --> 00:04:29,919
progress ships that came up and

107
00:04:33,590 --> 00:04:31,120
when a

108
00:04:36,710 --> 00:04:33,600
another vehicle uh docked with the

109
00:04:38,870 --> 00:04:36,720
station they had to shift their sleep

110
00:04:42,230 --> 00:04:38,880
wake schedule

111
00:04:44,469 --> 00:04:42,240
to accommodate the incoming vehicle and

112
00:04:47,510 --> 00:04:44,479
this puts a lot of

113
00:04:49,590 --> 00:04:47,520

challenge to the circadian system

114
00:04:51,430 --> 00:04:49,600
because they have to shift the timing of

115
00:04:54,150 --> 00:04:51,440
their sleep wake schedule it's like

116
00:04:55,510 --> 00:04:54,160
traveling across time zones and then

117
00:04:58,070 --> 00:04:55,520
they would

118
00:04:59,749 --> 00:04:58,080
shift their schedule back after the

119
00:05:01,430 --> 00:04:59,759
vehicle left

120
00:05:04,390 --> 00:05:01,440
and so

121
00:05:06,150 --> 00:05:04,400
we will see how much that occurs on this

122
00:05:07,749 --> 00:05:06,160
one year mission

123
00:05:09,670 --> 00:05:07,759
if that

124
00:05:11,110 --> 00:05:09,680
if those shifts occur throughout the

125
00:05:14,629 --> 00:05:11,120
one-year mission like they did the

126
00:05:17,430 --> 00:05:14,639
six-month mission we may see a lot of

127
00:05:20,550 --> 00:05:17,440
the same sleep deficiency taking place a

128
00:05:21,990 --> 00:05:20,560
lot of those circadian challenges

129
00:05:24,150 --> 00:05:22,000
and you're studying the one-year crew

130
00:05:26,790 --> 00:05:24,160
members that would be astronaut scott

131
00:05:28,629 --> 00:05:26,800
kelly and also mikhail konienko can you

132
00:05:30,870 --> 00:05:28,639
tell me what it is that they do to

133
00:05:31,909 --> 00:05:30,880
participate in this particular study for

134
00:05:34,150 --> 00:05:31,919
you

135
00:05:36,870 --> 00:05:34,160
sure we're using the same protocol that

136
00:05:39,270 --> 00:05:36,880
we use during the 10-year study so that

137
00:05:41,350 --> 00:05:39,280
we'll be able to compare

138
00:05:44,230 --> 00:05:41,360

the data that we collect in the one-year

139
00:05:46,469 --> 00:05:44,240
mission with the other data collection

140
00:05:49,110 --> 00:05:46,479
and what we have the the crew members do

141
00:05:51,830 --> 00:05:49,120
first of all prior to

142
00:05:53,830 --> 00:05:51,840
flight we collect data to see how they

143
00:05:54,950 --> 00:05:53,840
sleep here on earth

144
00:05:57,029 --> 00:05:54,960
and then

145
00:05:59,270 --> 00:05:57,039
during the mission we monitor sleep

146
00:06:01,510 --> 00:05:59,280
throughout the mission and then we study

147
00:06:03,590 --> 00:06:01,520
it post flight as well

148
00:06:07,270 --> 00:06:03,600
during the study intervals what we have

149
00:06:09,350 --> 00:06:07,280
the crew member do is wear an actograph

150
00:06:12,150 --> 00:06:09,360
or an act a watch

151
00:06:14,150 --> 00:06:12,160
it it looks um something like the

152
00:06:15,590 --> 00:06:14,160
wearables that you see other people

153
00:06:17,510 --> 00:06:15,600
wearing

154
00:06:19,749 --> 00:06:17,520
to monitor their sleep here on earth

155
00:06:22,710 --> 00:06:19,759
like the fitbits or the jawbones or

156
00:06:25,270 --> 00:06:22,720
those type of devices we use a research

157
00:06:27,830 --> 00:06:25,280
quality device it's an accelerometer

158
00:06:30,550 --> 00:06:27,840
that measures motion of the wrist

159
00:06:33,510 --> 00:06:30,560
so they wear this continuously

160
00:06:34,710 --> 00:06:33,520
throughout the data collection periods

161
00:06:35,830 --> 00:06:34,720
and

162
00:06:39,749 --> 00:06:35,840
that

163
00:06:42,710 --> 00:06:39,759

we're able to use a software algorithm

164
00:06:44,309 --> 00:06:42,720
that estimates how much sleep the crew

165
00:06:48,469 --> 00:06:44,319
member is getting

166
00:06:50,230 --> 00:06:48,479
also we have the crew member fill out a

167
00:06:52,950 --> 00:06:50,240
daily log

168
00:06:54,950 --> 00:06:52,960
and on that log they tell us how much

169
00:06:56,950 --> 00:06:54,960
they think they slept

170
00:06:59,270 --> 00:06:56,960
and when they went to bed and when they

171
00:07:01,670 --> 00:06:59,280
got up that helps us interpret the

172
00:07:04,070 --> 00:07:01,680
actigraphy data we're collecting

173
00:07:06,710 --> 00:07:04,080
also on that log we're able to collect

174
00:07:09,189 --> 00:07:06,720
information about

175
00:07:11,189 --> 00:07:09,199
their subjective sleep quality and how

176
00:07:13,670 --> 00:07:11,199
alert they feel

177
00:07:16,870 --> 00:07:13,680
and we ask them about counter measures

178
00:07:19,350 --> 00:07:16,880
that they use so are they using caffeine

179
00:07:21,990 --> 00:07:19,360
to help them maintain alertness are they

180
00:07:23,990 --> 00:07:22,000
taking medications to help them

181
00:07:25,430 --> 00:07:24,000
go to sleep at night

182
00:07:27,990 --> 00:07:25,440
and

183
00:07:28,870 --> 00:07:28,000
on earth they fill out that log every

184
00:07:31,110 --> 00:07:28,880
day

185
00:07:33,430 --> 00:07:31,120
that during the data collection period

186
00:07:35,430 --> 00:07:33,440
and up in space they fill that out about

187
00:07:37,270 --> 00:07:35,440
every third week

188
00:07:39,110 --> 00:07:37,280

and are they wearing the actor watch

189
00:07:40,629 --> 00:07:39,120
every day i know we've actually seen

190
00:07:42,710 --> 00:07:40,639
i've seen several people ask the

191
00:07:44,629 --> 00:07:42,720
question why they were two watches and i

192
00:07:46,150 --> 00:07:44,639
guess one of them is for them to tell

193
00:07:48,629 --> 00:07:46,160
time and then the other one is the actor

194
00:07:49,830 --> 00:07:48,639
watch for this particular sleep study so

195
00:07:51,350 --> 00:07:49,840
is this something that they're wearing

196
00:07:52,950 --> 00:07:51,360
continuously throughout the entire

197
00:07:54,550 --> 00:07:52,960
mission

198
00:07:57,110 --> 00:07:54,560
right so they wear it throughout the

199
00:07:59,270 --> 00:07:57,120
entire one-year mission and so we're

200
00:08:01,670 --> 00:07:59,280
going to have a lot of great data that

201
00:08:03,749 --> 00:08:01,680
we'll be able to analyze to look at

202
00:08:06,629 --> 00:08:03,759
their sleep on a day-to-day basis

203
00:08:08,550 --> 00:08:06,639
throughout the whole year in space

204
00:08:10,230 --> 00:08:08,560
how long will they be wearing this when

205
00:08:12,390 --> 00:08:10,240
they come home so that you can do some

206
00:08:14,950 --> 00:08:12,400
kind of comparative studies right so

207
00:08:16,950 --> 00:08:14,960
just for a couple weeks uh after they

208
00:08:20,790 --> 00:08:16,960
land and we will look at what we would

209
00:08:22,790 --> 00:08:20,800
call recovery sleep if they have a lost

210
00:08:26,390 --> 00:08:22,800
sleep in space or have any sleep

211
00:08:27,110 --> 00:08:26,400
deficiency then we see um

212
00:08:44,630 --> 00:08:27,120
a

213
00:08:46,230 --> 00:08:44,640

sleep

214
00:08:47,670 --> 00:08:46,240
thank you so much laura we really

215
00:08:49,350 --> 00:08:47,680
appreciate you coming out and talk

216
00:08:50,949 --> 00:08:49,360
talking with us good luck on the rest of

217
00:08:52,310 --> 00:08:50,959
your research and we look forward to

218
00:08:55,190 --> 00:08:52,320
hearing about the results of the one

219
00:08:56,790 --> 00:08:55,200
year crew mission and best of luck to