



1
00:00:07,990 --> 00:00:05,349
for generations we dreamed about a place

2
00:00:10,230 --> 00:00:08,000
to live and work in space

3
00:00:12,629 --> 00:00:10,240
a place where life up there would

4
00:00:15,669 --> 00:00:12,639
benefit life down here

5
00:00:17,590 --> 00:00:15,679
today that dream has come true

6
00:00:20,470 --> 00:00:17,600
research on the international space

7
00:00:21,349 --> 00:00:20,480
station improves lives all over the

8
00:00:24,390 --> 00:00:21,359
world

9
00:00:25,589 --> 00:00:24,400
the station's benefits for humanity grow

10
00:00:28,150 --> 00:00:25,599
every day

11
00:00:39,110 --> 00:00:28,160
and they can be told by the lives that

12
00:00:43,270 --> 00:00:40,630
is that two

13
00:00:45,830 --> 00:00:43,280

you say two

14

00:00:48,549 --> 00:00:45,840

i found a big lump in the side of my

15

00:00:53,590 --> 00:00:48,559

face and i kept going to doctor after

16

00:01:00,150 --> 00:00:56,869

and i was in so much pain at that time i

17

00:01:02,229 --> 00:01:00,160

was like dying in bed

18

00:01:06,149 --> 00:01:02,239

it hurts so bad i've never been in so

19

00:01:10,710 --> 00:01:08,230

i went for my first mri and then it

20

00:01:13,190 --> 00:01:10,720

showed up with like hundreds of tumors

21

00:01:15,350 --> 00:01:13,200

all over

22

00:01:17,749 --> 00:01:15,360

and then they sent me to

23

00:01:19,350 --> 00:01:17,759

not dr sutherland but someone who works

24

00:01:20,390 --> 00:01:19,360

in his office

25

00:01:21,190 --> 00:01:20,400

and

26

00:01:23,749 --> 00:01:21,200

he

27

00:01:25,190 --> 00:01:23,759

thought it was near fibromatosis which i

28

00:01:27,510 --> 00:01:25,200

have

29

00:01:29,590 --> 00:01:27,520

we didn't even realize what that was

30

00:01:31,270 --> 00:01:29,600

we'd always heard it called the elephant

31

00:01:33,030 --> 00:01:31,280

man disease

32

00:01:35,350 --> 00:01:33,040

there's different uh

33

00:01:37,670 --> 00:01:35,360

types of neurofibromatosis one of them

34

00:01:39,749 --> 00:01:37,680

the tumors grow on the outside of your

35

00:01:46,630 --> 00:01:39,759

skin the other one the tumors grow on

36

00:01:51,030 --> 00:01:48,310

a long time ago when we were thinking

37

00:01:53,429 --> 00:01:51,040

about this we approached mcdonald det

38

00:01:55,510 --> 00:01:53,439

welder associates it's a company that

39

00:01:56,630 --> 00:01:55,520

happens to be located in canada

40

00:01:59,270 --> 00:01:56,640

that built

41

00:02:01,590 --> 00:01:59,280

uh robots for space they built what

42

00:02:04,469 --> 00:02:01,600

canadians call canadarm

43

00:02:06,310 --> 00:02:04,479

and then they constructed the special

44

00:02:08,790 --> 00:02:06,320

purpose dexterous manipulator for the

45

00:02:11,029 --> 00:02:08,800

international space station

46

00:02:14,229 --> 00:02:11,039

and the idea was

47

00:02:16,309 --> 00:02:14,239

if they could build such complex robots

48

00:02:18,229 --> 00:02:16,319

perhaps in collaboration with medicine

49

00:02:23,190 --> 00:02:18,239

we could build a robot that could

50

00:02:28,390 --> 00:02:26,309

we did not realize that it was

51
00:02:32,070 --> 00:02:28,400
built on the same

52
00:02:34,390 --> 00:02:32,080
material as the space arm and

53
00:02:36,470 --> 00:02:34,400
we're quite amazed that that's what he

54
00:02:38,630 --> 00:02:36,480
had made it out of but it's the

55
00:02:40,470 --> 00:02:38,640
multi-dexterity of the robot

56
00:02:43,350 --> 00:02:40,480
and that that robot

57
00:02:45,750 --> 00:02:43,360
could perform tasks that made us

58
00:02:47,750 --> 00:02:45,760
become increasingly confident that we

59
00:02:49,110 --> 00:02:47,760
could overcome the challenges related to

60
00:02:51,589 --> 00:02:49,120
building a robot

61
00:02:53,270 --> 00:02:51,599
that could operate inside an mr machine

62
00:02:56,790 --> 00:02:53,280
with the precision the accuracy and the

63
00:02:59,030 --> 00:02:56,800

dexterity of a neurosurgeon

64

00:03:01,670 --> 00:02:59,040

it just so happened that the first

65

00:03:03,830 --> 00:03:01,680

individual was a young woman

66

00:03:05,350 --> 00:03:03,840

and the young woman harbored a fairly

67

00:03:08,949 --> 00:03:05,360

complex tumor

68

00:03:11,190 --> 00:03:08,959

underneath the front part of her brain

69

00:03:13,270 --> 00:03:11,200

a machine like neuron

70

00:03:16,229 --> 00:03:13,280

can manipulate tools

71

00:03:19,030 --> 00:03:16,239

at an accuracy of 50 microns that is

72

00:03:21,350 --> 00:03:19,040

overwhelmingly superior to what the best

73

00:03:22,710 --> 00:03:21,360

surgeon might be able to do

74

00:03:24,309 --> 00:03:22,720

i think it's

75

00:03:28,229 --> 00:03:24,319

fabulous and

76

00:03:30,309 --> 00:03:28,239

to me it's actually mind-boggling that

77

00:03:32,630 --> 00:03:30,319

someone can take that material and put

78

00:03:35,750 --> 00:03:32,640

it into

79

00:03:37,030 --> 00:03:35,760

a life-saving device

80

00:03:38,630 --> 00:03:37,040

that

81

00:03:43,030 --> 00:03:38,640

can help

82

00:03:47,190 --> 00:03:45,110

i honestly think that right now i'd be

83

00:03:50,070 --> 00:03:47,200

bedridden i would not be able to get out

84

00:03:51,670 --> 00:03:50,080

of bed if it's not for my doctors

85

00:03:58,390 --> 00:03:51,680

my parents would be taking care of my

86

00:04:03,110 --> 00:04:00,949

i guess like i'm glad that it hopefully

87

00:04:05,190 --> 00:04:03,120

helped people who have my disease and i

88

00:04:06,149 --> 00:04:05,200

hope that it helps people

89

00:04:07,030 --> 00:04:06,159

who

90

00:04:09,990 --> 00:04:07,040

need

91

00:04:11,910 --> 00:04:10,000

surgery in the future

92

00:04:14,390 --> 00:04:11,920

if they're ever propositioned with a