SCIENTIFIC AMERICAN FRONTIERS PROGRAM #1501 "Surgical Slimmers"

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SURGICAL SLIMMERS TEASE

ALAN ALDA Hello and welcome to Scientific American Frontiers. I'm Alan Alda. Our program this week is on a subject we've all heard about -- the obesity epidemic. More and more adults are obese, children are obese, and this is not just an American problem -- it's becoming global. For most people who are a hundred pounds or more overweight, it's practically impossible to lose the weight and keep it off through dieting alone. So in spite of the risks -- which are considerable -- people are lining up to solve their weight problems in the operating room. That's what we're focusing on tonight -- weight loss surgery. We're going to see how different kinds of stomach surgery work, and we'll meet the patients and their surgeons. We're going to look at an experimental implanted stomach pacer, which is supposed to make you feel full. And we're going to check in with some old friends of Frontiers, who've been losing weight -- and gaining it -- for the last two years. That's coming up on tonight's episode, Surgical Slimmers.

I LOST AN ENTIRE PERSON

ALAN ALDA (NARRATION) In our episode called "Losing It," we followed for a year the fortunes of people as they tried to lose weight. Towards the end, our group got together for a calorie-controlled reunion. Eight of our group used various diets. Almost all of us lost weight — me included — and some had health benefits, like lower blood pressure. Robin was our champion dieter, losing 45 pounds.

ALAN ALDA Do you have any health issues that have gone away since you...

ROBIN Just fat.

ALAN ALDA (NARRATION) Now after one more year, half of us have managed to stay within a couple of pounds of our weights a year ago. Half of us are regaining weight —some quite a lot. The people who lost the most have now regained the most. This is a near universal experience in weight loss — the more we lose, the harder it is to keep the weight off. Our bodies fight back in ways that

aren't well understood. Our group included two people, Amy and Rodney, who had gastric bypass surgery to lose weight. They started out heavier than the others and, as expected, by the time of our reunion a year ago, they had lost the most. Their whole attitude to food had changed.

ALAN ALDA Do you just eat now in a utilitarian way? Or do you enjoy your food?

AMY I eat because now I have to nourish my body, you know what I mean? And I concentrate on the protein, because that's what they want you to get -- 65 to 80 grams of protein a day.

ALAN ALDA And is it hard to get that down?

AMY Oh, it's wicked hard.

ALAN ALDA Really?

AMY Yes. Because you're not hungry so you have to remind yourself to eat.

ALAN ALDA Is it harder to remind yourself to eat than it used to be to remind yourself to eat less?

AMY Yeah.

ALAN ALDA It is?

AMY Uhuh.

ALAN ALDA So, is this really good?

AMY Yeah.

RODNEY It is good.

AMY It is. It really is.

RODNEY Like Amy says, we're never hungry.

ALAN ALDA Is this something you would recommend?

RODNEY If I'd have kept going the way I was going, there was a danger that I wasn't gonna live another year...

ALAN ALDA Yeah.

RODNEY You know because I was headed for a stroke.

ALAN ALDA (NARRATION) Unlike our dieters, in the last year Amy and Rodney have continued to lose weight — Rodney a further 19 pounds, and Amy 71. From the start, we gave video cameras to our group so they could record diaries. Rodney used to work hard on the deck of a fishing boat, and he stayed in shape. Then he bought his own boat, sat in the skipper's chair all day, and the weight accumulated. His doctor said he was heading for trouble.

RODNEY In the last few years I've been diagnosed as a diabetic. I have high blood pressure. I have sleep apnea. And that's all due to overweight, being overweight. My knees have been, in the last year, year and a half, my knees have been killing me. So if I don't do this I'm looking at knee surgery, replacement. And I just want a better quality of life in my later years. I worked hard all my years. I want to enjoy my later years with my grandchildren.

ALAN ALDA (NARRATION) Here's the production team bringing Amy her video diary camera.

JULIE Hi, Amy.

AMY Hi.

JULIE How are ya?

AMY Good.

JULIE Here to set up the camera.

AMY OK.

ALAN ALDA (NARRATION) Amy and Rodney were both preparing for the most common weight loss surgery in the US — gastric bypass. Contrary to popular opinion, it's not just an easy option. You still have to change your eating habits to be successful.

AMY'S DIARY This week's been kind of rough. I got on the scale and I did gain a couple of pounds, which I was really discouraged about. And I think that's where that, "Oh, even though I have a surgery date" mentality comes in, that I allowed myself to eat the things that I shouldn't have. So now, you know, tighten up the belt again, and back to the grindstone. Now that it's only a few hours away, I'm feeling a little ... I'm not really anxious, I'm just... It's the unknown, I think.. It's just

a lot of emotions come out. Because you just think about everything. And, I don't know. It's time to go to bed, though.

ALAN ALDA (NARRATION) Amy and Rodney are in a surgical program at a Boston hospital.

SCOTT SHIKORA You all set?

AMY I'm set.

SCOTT SHIKORA Alright.

AMY Are you ready?

SCOTT SHIKORA We are. You're seeing the A-Team today.

ALAN ALDA (NARRATION) When Amy had her surgery, two years ago, I was there to observe.

ALAN ALDA If seventy-five to eighty percent of the patients are successful at reducing their weight, what happens to the other twenty, twenty-five percent who have had a kind of severe operation. Can it be reversed?

SCOTT SHIKORA It can be reversed, but it's very difficult to reverse it. And if somebody fails, and gains their weight back, or never loses the weight they should lose, there's no reason to reverse it, because essentially they've behaviorally reversed it. Now what we're going to do is go through every layer of the abdominal wall. Everything you see yellow is usually fat.

ALAN ALDA How are you getting through those layers?

SCOTT SHIKORA This instrument has a little blade at the tip, and when you hit the trigger the blade juts out and it makes a little cut.

ALAN ALDA I see.

ALAN ALDA (NARRATION) The laparoscopic instruments are monitored with a fiber-optic TV camera.

SCOTT SHIKORA So that's called a linear stapler.

ALAN ALDA (NARRATION) The surgeons make a new, smaller stomach out of the top few inches of the natural one, using an instrument that staples and cuts at the same time.

SCOTT SHIKORA We're going to sculpture this little stomach chamber or pouch.

ALAN ALDA (NARRATION) Amy's new stomach will hold only about one ounce, whereas her natural one held half a gallon. The natural stomach will remain in place, to keep generating digestive fluids.

MICHAEL TARNOFF So this part here is going to be her new stomach.

SCOTT SHIKORA That's the first major portion of the operation is just getting that pouch created.

ALAN ALDA So now you have the esophagus naturally going into that new pouch.

SCOTT SHIKORA Correct.

ALAN ALDA And then you have a new connection from that pouch to the intestine.

SCOTT SHIKORA Correct.

ALAN ALDA (NARRATION) To connect the pouch to the intestine, the surgeons first cut the intestine below the stomach and make a new connection for the natural stomach lower down.

SCOTT SHIKORA So that's the completed closed connection. So we're down to the last major step which is connecting the intestine up to that one ounce stomach chamber.

ALAN ALDA (NARRATION) Finally, the intestine that had been cut below the natural stomach is brought up and connected to the new, small stomach.

MICHAEL TARNOFF There we go. Look under here. OK.

SCOTT SHIKORA OK?

MICHAEL TARNOFF Yeah.

ALAN ALDA (NARRATION) The procedure takes about 90 minutes total.

SCOTT SHIKORA So the bulk of the operation is done. We'll throw an extra stitch or two in a few places and then we close.

ALAN ALDA (NARRATION) Four months after surgery, Amy achieved one of her goals — shopping in a regular, not a plus-size, store.

AMY I would never wear a cocktail dress, because I wouldn't want that much of my body showing. I mean I still have a long way to go, but I'm at a point now that I can wear a cocktail dress and get away with it and not be like, everybody looking at you like, What in the world do you think you're doing? I don't like it. It's too big. It's like way too big in here. I like this dress. It's longer. It covers more. I like it. Everything has changed. You're a whole new person. I met a girl that I went to high school... in a store. And I said, "Oh, hi," and she goes, "Do I know you?" I lost a person. I lost an entire person.

RODNEY It's March today, right? So in the middle of summer I'll be in my Speedo bathing suit.

ALAN ALDA (NARRATION) Rodney was up and about soon after his surgery.

RODNEY Hi ya. How ya doing?

ALAN ALDA Oh you look great -- walking around. When did you have your operation?

RODNEY Yesterday.

ALAN ALDA Yesterday and you're already around walking?

RODNEY I was walking at three o'clock this morning.

ALAN ALDA Really?

RODNEY Yeah. It felt good to walk. ALAN ALDA Are you in any discomfort?

RODNEY No, just a little. You know, you know that somebody's done something. Before I came here, I was like a very closed person, I didn't talk to anybody. Now they can't shut me up . When I come here I talk to everybody, you know.

ALAN ALDA So what's the relationship between being more open and getting your diet more...

RODNEY I don't know I feel comfortable with the people and I know they're going through the same thing I'm going through. So it's not like we're trying to, you know hide anything from anyone.

ALAN ALDA So does that mean that you're more honest with yourself about what you're eating?

RODNEY Yes, yes, yes.

ALAN ALDA That's interesting. Being closed off from other people in a way is a way of being closed off from yourself.

RODNEY Exactly. This is my attire before I had my operation. Now I can fit another person in here. I wasn't able to button this shirt. Now I got a little room. Actually, I've gone down a size. This is the shirt. Towards the end there these buttons would be like this, before my operation. I haven' felt this good in a long time. I can't remember when, to tell you the truth. The energy I have now is unbelievable. I look at life like I've gotten a second chance at it. I go on vacations. I go to amusement parks, swimming, wear shorts, go to the beach -- these are things that I haven't done in years. And it's a brand new outlook on life. I'm 60, and I'm like I'm 16 again.

BUCKLE UP

ALAN ALDA (NARRATION) This is a different kind of obesity procedure, called a lap-band. It's less risky than a gastric bypass like Rodney's or Amy's, in which three in a thousand patients will die.

SCOTT SHIKORA The band is in the abdomen. You can see it , it's up next to the liver. And we're going to now pass the band around the back of the esophagus. We're putting this on the way you put a collar on a dog's neck. And now we're going to buckle the band.

ALAN ALDA (NARRATION) The tightness of the band can be adjusted, just in an office visit. It's also possible to remove it, whereas reversing bypass surgery is very hard. The band creates a small chamber at the top of the stomach.

SCOTT SHIKORA The food that's sitting in the little chamber , the tighter the band is, the slower it can get through, and while there's food sitting up there at the very top of the stomach, the brain perceives it as if the entire stomach was full.

ALAN ALDA (NARRATION) Patients can defeat the lap band by simply eating all the time — what's called grazing. Over all it's a bit less effective than bypass surgery. But with both approaches, the key to success is continuing followup and support, to help control harmful eating behavior.

RODNEY Before I entered this program I was 375 pounds. This morning, I weighed 224 and I had the operation six months ago.

ALAN ALDA (NARRATION) They've found that patients who skip their followups are the least successful at losing weight.

RODNEY I haven't come to one of these support groups that I haven't walked out of here with a tool. And I'll never forget my very first one I came to. There was a lady talking about how she controlled what she ate. And she always would say, she would get a napkin and put it over half of her plate, and only eat what was exposed. I told my wife about it, and just the other day, we were eating, and she noticed that I was eating a little bit more. She grabbed a napkin and put it over half the plate.

MICHAEL TARNOFF People that are ten years out from these operations report increased appetite, cravings, all those things, and without a proper adjustment in psychological behavior and eating patterns, there's a propensity to regain weight.

SCOTT SHIKORA The bottom line is none of these surgeries are a cure for obesity in a vacuum. They all have to be part of a program that provides the behavior and the counseling.

THE PACER

ALAN ALDA (NARRATION) There's now a new development in weight loss surgery. One of the first beneficiaries lives here. As he was approaching middle age, Bill found it harder and harder to cope with his weight problem.

BILL When I was forty years old I think I went on my first diet. I had lost I think, at least three times, sixty or seventy pounds, only to gain it right back and gain more.

ALAN ALDA (NARRATION) Bill was one of the first patients to receive an experimental treatment being tested by Scott Shikora and his team — the group that treated Amy and Rodney. The new treatment is much less traumatic than bypass surgery, less invasive even than the lap band. It's an implantable stomach pacer similar to a heart pacemaker. Bill is one of an initial trial group who had implants 4 years ago. He's lost 70 pounds, and now he finds he can keep it off.

BILL Before, I could probably eat two of these sandwiches, where now I can eat a sandwich and probably I'll hold off until supper time, because I'll feel a lot more satisfied with this sandwich. Before, there's cookies, and then I'd graze a little bit

for whatever is in the cabinet. Now I don't have to do that, and I attribute that to the device.

SCOTT SHIKORA Now I'm creating the pocket that we're going to plant the device in.

ALAN ALDA (NARRATION) The results with Bill's group were promising enough that a new, large trial is beginning. The surgeons carefully mark the points on the patient's stomach where the pacer's electrodes will be implanted. They have to be close to the nerve bundle which runs from the stomach to the brain.

SCOTT SHIKORA You see here are the electrodes, and this length has to be completely covered by stomach wall. So we measure.

ALAN ALDA (NARRATION) Implantation is done laparoscopically, for minimum impact on the patient. The laparoscopic camera shows the electrode lead being snaked into the abdominal cavity. Now comes the tricky part. The electrode has to be positioned within the stomach wall. If it penetrates into the stomach interior, it would cause infection. So the surgeons use a second camera inside the stomach to check.

SCOTT SHIKORA We don't want to see any metal.

ALAN ALDA (NARRATION) It looks as if the electrode — at the top of the screen — has indeed just pierced the stomach wall.

SCOTT SHIKORA I'm deep, so now I'm going to just back it out and reposition it.

ALAN ALDA (NARRATION) The pacer is turning out to be extremely safe. To date there have been 600 implants worldwide, without a single death or even major complication. Scott repositions the electrode, and they re-check the interior view of the stomach.

MICHAEL TARNOFF See anything Dave?

DAVE I do not see the needle.

ALAN ALDA (NARRATION) Two electrodes are implanted, and their leads connected to the pacer.

SCOTT SHIKORA Alright. Let's check it.

ALAN ALDA (NARRATION) Then before it goes into the body, the pacer's connections are given a final check, using a remote interrogator. The same system will be used to control the pacer in the coming months and years.

SHAWN KOSKO OK, it's good.

ALAN ALDA (NARRATION) This is one of 190 patients in the new trial, which like all such studies has to follow strict rules.

SHAWN KOSKO The next step is the patient will come back in 14 days, and at that time they will be randomized to either on or off. It's a double blinded, randomized, placebo study, so neither the company, nor Dr. Shikora nor Dr. Tarnoff know who will be on, who will be off.

SCOTT SHIKORA Or the patient.

SHAWN KOSKO Or the patient.

ALAN ALDA (NARRATION) The patients will be followed for a year. That's Stephanie on the table. A couple of days later we visited her at home. Only people who would qualify for bypass surgery, by being at least 100 pounds overweight, are in the trial. But the pacer is potentially a more attractive option than surgery.

STEPHANIE I wasn't comfortable with such a harsh surgery, and cutting my stomach down, and knowing that there are so many complications. I don't think I was at that point where I was able to risk my life for it, because it wasn't destroying me physically. I was still able to do things.

ALAN ALDA (NARRATION) They found in Bill's trial that the pacer only seems to work for people, like him, who are grazers — constantly eating, but a little bit at a time. Somehow the pacer makes you feel full, and grazers can respond to that signal. It doesn't work for binge eaters — people who eat a lot and ignore all fullness signals.

VOICE Which of the statements do you agree with most?

ALAN ALDA (NARRATION) So in the new trial, likely binge eaters like this have been screened out.

VOICE I feel incapable of controlling urges to eat. I have a fear of not being able to stop eating voluntarily.

ALAN ALDA (NARRATION) Whereas Stephanie's classic grazing behavior is the kind they can probably change.

STEPHANIE I try to take small portions and then eventually I just get bored with the food, and I'll stop eating it. And then half and hour, maybe not even an hour, later I'll start snacking. And I pretty much will do that continually for the rest of the night.

ALAN ALDA (NARRATION) We're back with the obesity surgical group. Bill's on the table, fully awake. Using local anesthetic, Mike Tarnoff is replacing Bill's pacer, because its battery has run down.

MICHAEL TARNOFF So there's the device. There's the single lead.

ALAN ALDA (NARRATION) Bill's early model pacer used one implanted electrode. Two seem to be better, although it's not really clear why.

MICHAEL TARNOFF There's some thought now that by using the dual lead system we're capturing more of the neurovascular bundle.

ALAN ALDA (NARRATION) Exchanging the pacer is a simple matter. New units run for up to 18 months, depending on the particular patient. We'll see why in a moment, when Bill's new pacer is switched on.

MICHAEL TARNOFF Right, give that another push. OK.

ALAN ALDA (NARRATION) The system is interrogated.

JAN HARRISON OK, impedance numbers look. OK.

ALAN ALDA (NARRATION) And in goes the new one.

MICHAEL TARNOFF Bill, we're just putting some stitches in. Everything looks good.

NURSE Let me just have you sit up here now. Just sit on the side of the bed here. Get your balance a little bit.

BILL OK.

ALAN ALDA (NARRATION) Next it's time to switch on. Now the pacer's interrogated through the skin.

JAN HARRISON We're going to turn the device on, and you let me know what you're feeling -- any symptoms, like cramping, stimulation.

BILL OK I can feel something now, shooting right across here.

JAN HARRISON So you're feeling it up in your chest?

BILL Yeah

JAN HARRISON Uhuh.

BILL It's like a tightening in here, right across, a shooting pain.

JAN HARRISON We don't want the patient walking out of here with that feeling. So what I'm going to do is to set the device so that it's pacing, but just below the threshold of his symptoms. Do you still have the symptom?

BILL No.

JAN HARRISON No. It's gone?

BILL It's gone, yeah.

JAN HARRISON Patients have very different sensations with this pacing. When we go through the programming, I'm actually quite amazed at how many different symptoms we get. Some patients almost feel nothing, even with very high voltage, and other patients are very sensitive to this pacing.

ALAN ALDA (NARRATION) Battery life will depend on how high the pacing voltage has to be set. If the pacer is eventually approved, it'll be an important new weapon in the battle against obesity. It's much less risky than the bypass surgery that Amy and Rodney had. So it could be used for children or the elderly — both groups with increasing numbers of the obese, but for whom major surgery is too drastic a step. It seems startling to be talking about such widespread use of surgical treatments for obesity, but for Scott Shikora, this is something we have to do.

SCOTT SHIKORA We hear a lot of comments about, Why are you treating people when their problem is they just can't stop eating? But obesity is a much more complex problem than that, and it is a disease. And if we're willing to do heart surgery, and lung surgery on smokers, and we're willing to do liver transplants on patients who have destroyed their livers from alcohol, I don't see how obesity is different.

BILL People are very condescending to people that are obese, right? I think it's the last of the great prejudices. You can't call a man an ethnic name, but you could call him, or use the word "fat", and no-one would be ashamed of it. You know, no-one would even pick up on it, you know what I mean? I would say to anybody that thinks that, you know, devices or whatever... I'm losing it a little bit on this, but... People that never had a weight problem don't understand what it is to have a weight problem. They're very sympathetic to everything other than -- that person did it to himself, and they don't realize that a lot of us didn't do it to ourselves.

SCOTT SHIKORA By performing surgery we're giving people another shot at life. They can live longer, they can live healthier, and they can be more productive.