



# Current Management of Intestinal Failure

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# Disclosures

I am a consultant and lead clinical trial investigator for Zealand Pharma. They make an intestinal growth factor called glepaglutide, a drug with the potential to help patients with intestinal failure. I will not discuss off label use of medications, but may discuss this product in pointing towards future directions in the field.

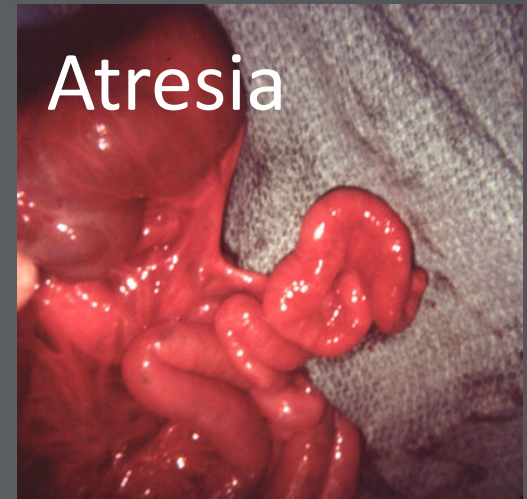
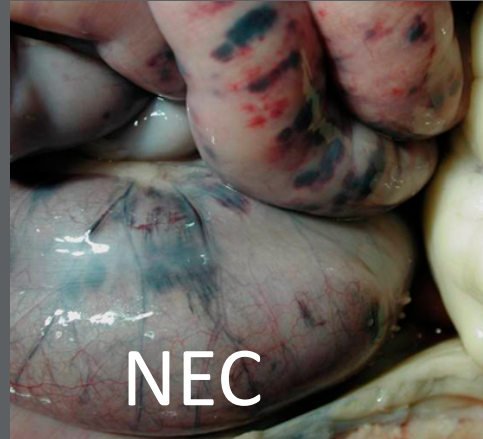




# What is Intestinal Failure?

Inability to maintain nutrition and/or hydration solely with your own intestines.

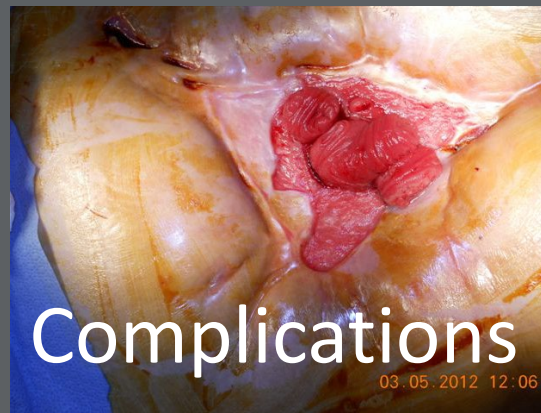
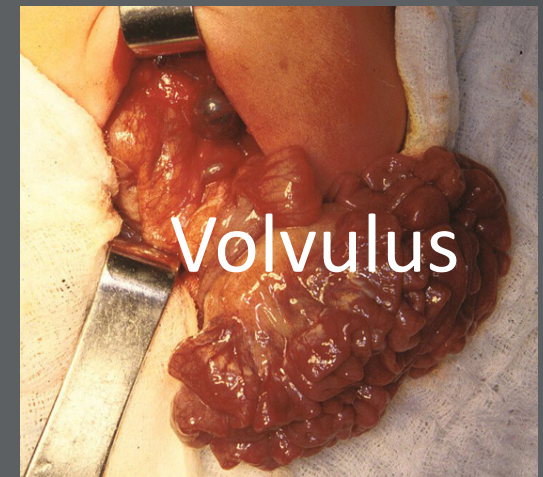




Not enough bowel  
Catastrophic or gradual

-OR-

Enough bowel, but doesn't  
work properly





**How can you treat this?**

Rehabilitation

Transplant



# Kidney Transplants

National numbers, OPTN data 04/21/21

		To Date	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	
All Center States		498,372	5,795	22,817	23,401	21,167	19,849	19,060	17,878	17,108	16,896	16,487	16,816	16,900	16,900
All		9,164	89	353	386	375	387	316	331	334	343	386	349	346	346



# Kidney Transplants

Survival OPTN 4/21/21

Region	Recipient Age	Years Post Transplant	Number Functioning / Alive	Survival Rate
U.S.	< 1 Year	1 Year	5	*
U.S.	1-5 Years	1 Year	649	95.2
U.S.	6-10 Years	1 Year	525	96.4
U.S.	11-17 Years	1 Year	1602	97.0
U.S.	18-34 Years	1 Year	8397	96.5
U.S.	35-49 Years	1 Year	16589	95.7
U.S.	50-64 Years	1 Year	24990	94.5
U.S.	65 +	1 Year	11318	91.7
U.S.	< 1 Year	3 Year	3	*
U.S.	1-5 Years	3 Year	631	92.6
U.S.	6-10 Years	3 Year	501	94.2
U.S.	11-17 Years	3 Year	1443	89.8
U.S.	18-34 Years	3 Year	6951	88.1
U.S.	35-49 Years	3 Year	14762	90.4
U.S.	50-64 Years	3 Year	22416	87.9
U.S.	65 +	3 Year	9340	82.2
U.S.	< 1 Year	5 Year	6	*
U.S.	1-5 Years	5 Year	525	87.7
U.S.	6-10 Years	5 Year	483	88.0
U.S.	11-17 Years	5 Year	1248	78.2
U.S.	18-34 Years	5 Year	5983	79.4
U.S.	35-49 Years	5 Year	13281	82.9
U.S.	50-64 Years	5 Year	18838	78.3
U.S.	65 +	5 Year	7000	69.7

1 y ~95%

3y ~90%

5y ~80%



# Liver Transplants

Survival OPTN 4/21/21

Liver Patient Go							export print	portrait	landscape
Region	Recipient Age	Years Post Transplant	Number Functioning / Alive	Survival Rate	95% Confidence Interval				
U.S.	< 1 Year	1 Year	477	93.9	(91.5, 95.7)				
U.S.	1-5 Years	1 Year	747	94.3	(92.4, 95.7)				
U.S.	6-10 Years	1 Year	274	96.3	(93.3, 97.9)				
U.S.	11-17 Years	1 Year	400	95.2	(92.8, 96.8)				
U.S.	18-34 Years	1 Year	1298	93.9	(92.5, 95.0)				
U.S.	35-49 Years	1 Year	3519	92.9	(92.0, 93.7)				
U.S.	50-64 Years	1 Year	13174	90.9	(90.5, 91.4)				
U.S.	65 +	1 Year	3496	88.1	(87.0, 89.0)				
U.S.	< 1 Year	3 Year	494	90.4	(87.7, 92.5)				
U.S.	1-5 Years	3 Year	658	89.3	(86.8, 91.3)				
U.S.	6-10 Years	3 Year	245	93.5	(89.9, 95.9)				
U.S.	11-17 Years	3 Year	394	92.6	(89.7, 94.7)				
U.S.	18-34 Years	3 Year	1047	86.8	(84.9, 88.6)				
U.S.	35-49 Years	3 Year	3113	85.9	(84.7, 87.0)				
U.S.	50-64 Years	3 Year	11378	82.2	(81.6, 82.8)				
U.S.	65 +	3 Year	2392	76.8	(75.3, 78.3)				
U.S.	< 1 Year	5 Year	520	87.4	(84.6, 89.8)				
U.S.	1-5 Years	5 Year	665	85.4	(82.8, 87.7)				
U.S.	6-10 Years	5 Year	269	93.5	(90.1, 95.8)				
U.S.	11-17 Years	5 Year	324	86.6	(82.9, 89.6)				
U.S.	18-34 Years	5 Year	939	79.5	(77.2, 81.6)				
U.S.	35-49 Years	5 Year	3016	79.7	(78.4, 80.9)				
U.S.	50-64 Years	5 Year	9807	73.5	(72.8, 74.2)				
U.S.	65 +	5 Year	1757	67.5	(65.7, 69.2)				

1 y ~93%

3y ~83%

5y ~78%

# Liver Transplants

National numbers, OPTN data 04/21/21

	To Date	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
	184,228	2,252	8,906	8,896	8,250	8,082	7,841	7,127	6,730	6,455	6,256	6,342	6,291	6,291





# Lung Transplants

Survival OPTN 4/21/21

<div> <input type="text" value="Lung"/> <input type="button" value="Patient"/> <input type="button" value="Go"/> </div>				
Region	Recipient Age	Years Post Transplant	Number Functioning / Alive	Survival Rate
U.S.	< 1 Year	1 Year	12	100.0
U.S.	1-5 Years	1 Year	16	73.7
U.S.	6-10 Years	1 Year	25	89.3
U.S.	11-17 Years	1 Year	99	86.2
U.S.	18-34 Years	1 Year	699	89.3
U.S.	35-49 Years	1 Year	813	89.8
U.S.	50-64 Years	1 Year	3151	88.6
U.S.	65 +	1 Year	1809	83.9
U.S.	< 1 Year	3 Year	12	66.7
U.S.	1-5 Years	3 Year	14	67.2
U.S.	6-10 Years	3 Year	25	84.1
U.S.	11-17 Years	3 Year	71	62.3
U.S.	18-34 Years	3 Year	538	69.6
U.S.	35-49 Years	3 Year	675	75.9
U.S.	50-64 Years	3 Year	2374	72.2
U.S.	65 +	3 Year	1183	62.1
U.S.	< 1 Year	5 Year	8	*
U.S.	1-5 Years	5 Year	9	*
U.S.	6-10 Years	5 Year	19	74.7
U.S.	11-17 Years	5 Year	58	48.6
U.S.	18-34 Years	5 Year	370	55.0
U.S.	35-49 Years	5 Year	561	65.4
U.S.	50-64 Years	5 Year	1773	57.1
U.S.	65 +	5 Year	675	44.8

1 y ~88%

3y ~72%

5y ~55%

# Lung Transplants

National numbers, OPTN data 04/21/21

To Date	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
44,212	627	2,539	2,714	2,530	2,449	2,327	2,057	1,925	1,923	1,754	1,822	1,769



# Intestine Transplants

Survival OPTN 4/21/21

Intestine Patient Go				
Region	Recipient Age	Years Post Transplant	Number Functioning / Alive	Survival Rate
U.S.	< 1 Year	1 Year	15	88.5
U.S.	1-5 Years	1 Year	106	87.3
U.S.	6-10 Years	1 Year	26	93.5
U.S.	11-17 Years	1 Year	19	82.6
U.S.	18-34 Years	1 Year	66	88.2
U.S.	35-49 Years	1 Year	76	77.2
U.S.	50-64 Years	1 Year	69	69.6
U.S.	65 +	1 Year	1	*
U.S.	< 1 Year	3 Year	17	68.6
U.S.	1-5 Years	3 Year	84	72.2
U.S.	6-10 Years	3 Year	21	85.2
U.S.	11-17 Years	3 Year	17	73.9
U.S.	18-34 Years	3 Year	41	66.0
U.S.	35-49 Years	3 Year	63	70.9
U.S.	50-64 Years	3 Year	51	54.6
U.S.	65 +	3 Year	1	*
U.S.	< 1 Year	5 Year	42	63.8
U.S.	1-5 Years	5 Year	95	63.7
U.S.	6-10 Years	5 Year	22	82.3
U.S.	11-17 Years	5 Year	11	65.0
U.S.	18-34 Years	5 Year	49	58.7
U.S.	35-49 Years	5 Year	59	57.2
U.S.	50-64 Years	5 Year	40	39.0
U.S.	65 +	5 Year	3	*

1 y ~85%

3y ~70%

5y ~60%

# Intestine Transplants

National numbers, OPTN data 04/21/21

	To Data	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
All Center States	3,210	20	91	81	104	109	147	141	139	109	106	129	151	179	185	198	175
Alabama	5	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0
Arizona	5	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0
California	223	2	3	2	5	4	7	6	6	5	9	9	9	16	20	16	18
District of Columbia	309	2	18	17	18	20	20	17	19	13	19	20	17	20	23	22	18
Florida	498	4	17	12	20	17	24	21	21	12	4	11	11	16	25	20	33
Illinois	85	0	1	3	3	3	1	4	1	5	2	1	4	2	4	2	8
Indiana	280	1	7	5	8	8	15	16	18	17	24	26	29	29	20	22	14
Iowa	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maryland	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	28	1	0	0	0	2	2	0	0	2	1	2	0	4	3	2	4
Michigan	41	0	3	3	3	3	9	1	5	6	3	3	2	0	0	0	0
Minnesota	22	0	0	0	0	0	1	0	0	0	1	1	0	0	0	2	1
Missouri	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	501	1	11	6	11	12	23	20	21	19	14	12	26	26	32	36	21
New York	257	2	11	10	12	15	16	15	14	11	13	9	9	14	6	7	7
North Carolina	46	0	1	2	4	1	3	9	8	4	2	6	5	1	0	0	0
Ohio	165	3	10	13	12	14	17	24	20	11	3	5	12	9	9	8	4
Oklahoma	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania	653	3	8	6	5	8	6	8	6	4	9	20	27	37	42	52	44
South Carolina	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Texas	13	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	2
Virginia	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Washington	13	1	1	2	0	1	1	0	0	0	1	2	0	1	0	3	0
Wisconsin	22	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0

# Intestine Transplants

National numbers, OPTN data 04/21/21

	To Date	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
All Center States	3,210	20	91	81	104	109	147	141	139	109	106	129	151	179	185	198	175
Alabama	5	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0
Arizona	5	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0
California	223	2	3	2	5	4	7	6	6	5	9	9	9	16	20	16	18
District of Columbia	309	2	18	17	18	20	20	17	19	13	19	20	17	20	23	22	18
Florida	498	4	17	12	20	17	24	21	21	12	4	11	11	16	25	20	33
Illinois	85	0	1	3	3	3	1	4	1	5	2	1	4	2	4	2	8
Indiana	280	1	7	5	8	8	15	16	18	17	24	26	29	29	20	22	14
Iowa	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maryland	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	28	1	0	0	0	2	2	0	0	2	1	2	0	4	3	2	4
Michigan	41	0	3	3	3	3	9	1	5	6	3	3	2	0	0	0	0
Minnesota	22	0	0	0	0	0	1	0	0	0	1	1	0	0	0	2	1
Missouri	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	501	1	11	6	11	12	23	20	21	19	14	12	26	26	32	36	21
New York	257	2	11	10	12	15	16	15	14	11	13	9	9	14	6	7	7
North Carolina	46	0	1	2	4	1	3	9	8	4	2	6	5	1	0	0	0
Ohio	185	3	10	13	12	14	17	24	20	11	3	5	12	9	9	8	4
Oklahoma	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania	653	3	8	6	5	8	6	8	6	4	9	20	27	37	42	52	44
South Carolina	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Texas	13	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	2
Virginia	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Washington	13	1	1	2	0	1	1	0	0	0	1	2	0	1	0	3	0
Wisconsin	22	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0

Vast majority of patients will not need transplant

We recognize the inherent risk of transplant, and we will use it, willingly and skillfully, when it provides the best risk-benefit balance

Where transplant is unavoidable, we will minimize risk wherever possible

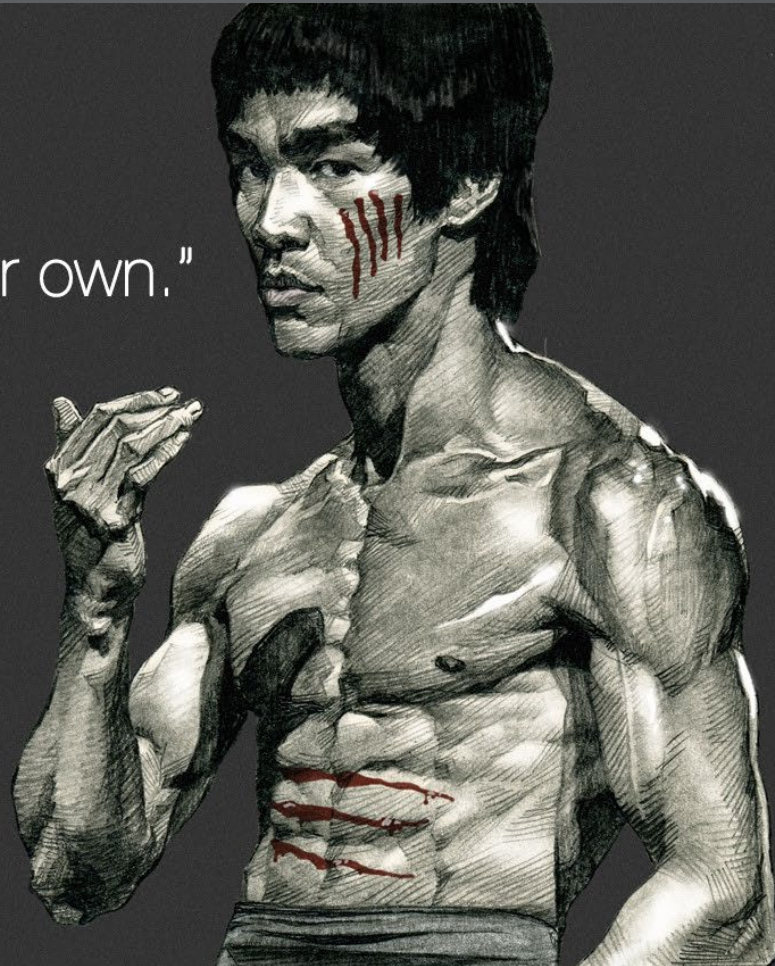


What can we do in  
intestinal rehab?



"Absorb what is useful,  
Discard what is not,  
Add what is uniquely your own."

- Bruce Lee








# Diet


- Frequent small meals
- Low concentrated sugars
- Higher fat and protein
- Drinks that contain solute
  - G2, Powerade Zero, ORS



# TPN Management

- Minimizing toxicity
- Maximizing time off
- Preventing dehydration



 **Introducing**  
a new lipid emulsion  
option for adults  
in the U.S.

[See More Information ▶](#)



# Medications

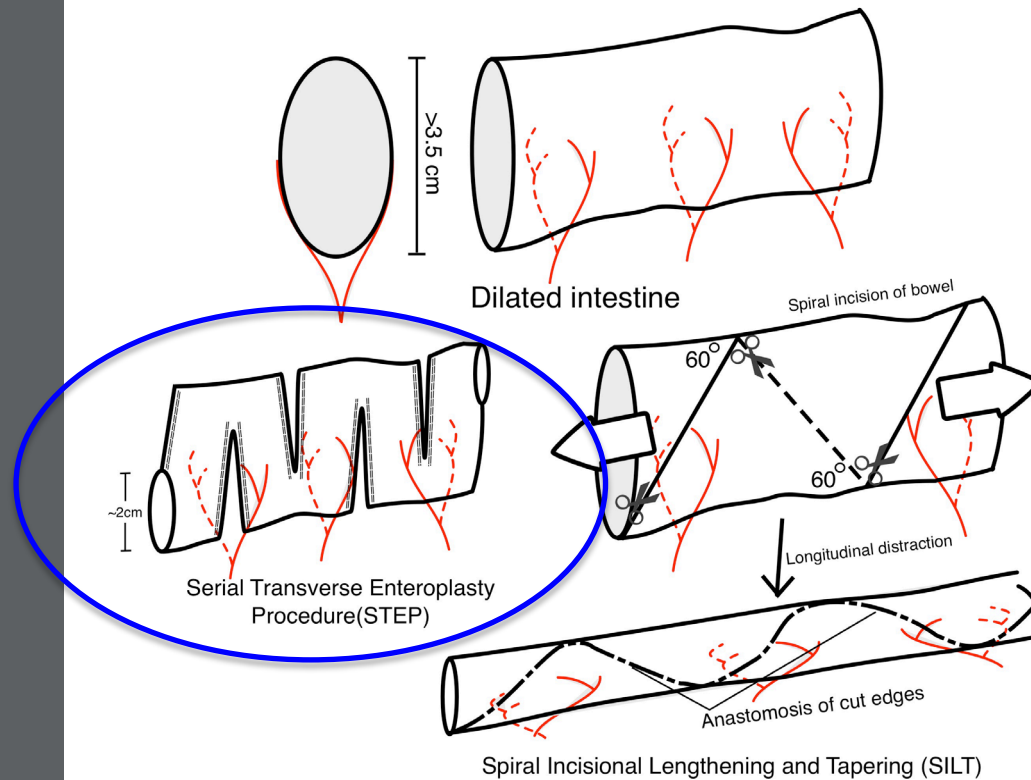
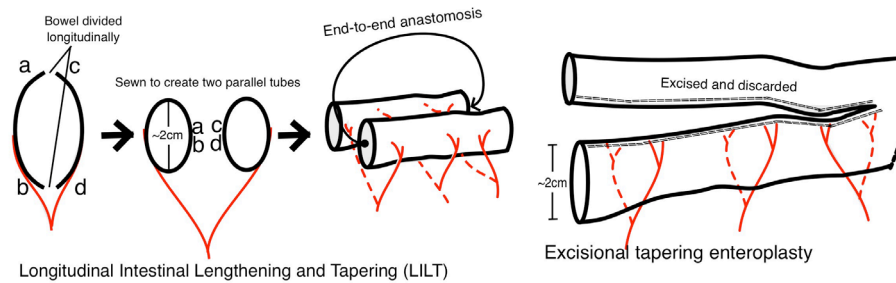
- To slow you down
  - loperamide, diphenoxylate
- To speed you up
  - erythromycin, metoclopramide, domperidone
- To make stool less toxic
  - cholestyramine, PPI/H2 blocker
- To modify bacteria
  - antibiotics, probiotics
- To help you absorb better



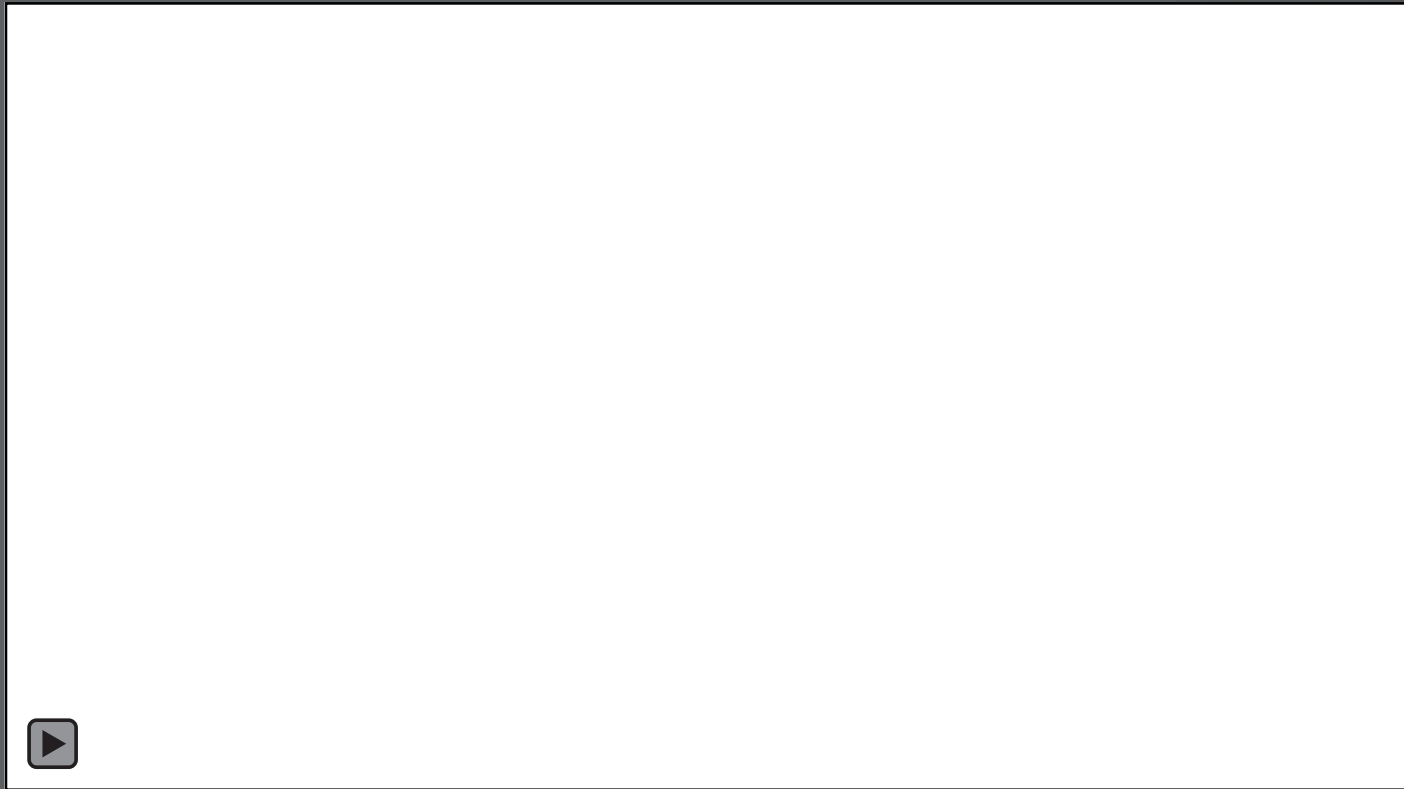


with  
Teduglutide  
Glepaglutide  
Apraglutide



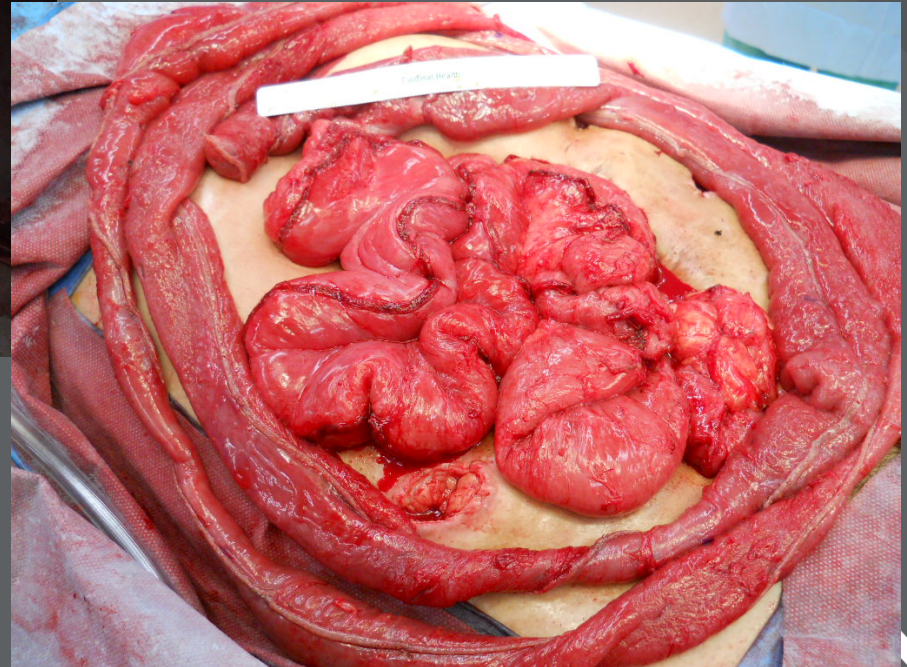
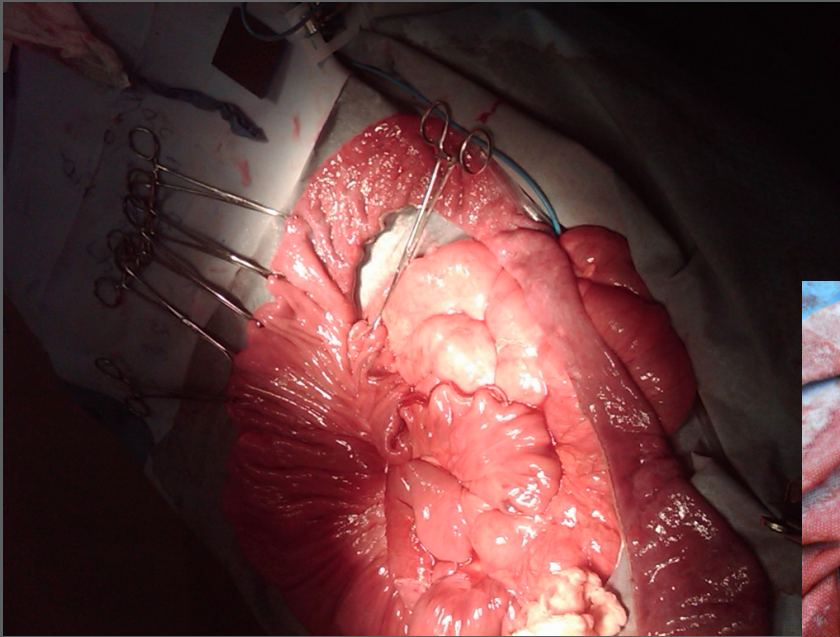


# Serial Transverse Enteroplasty (STEP)





# Longitudinal Excisional Tapering Enteroplasty (LETE)











**education, support,  
and advocacy services**



@ShortBowel



@GutFailure

**Short  
Bowel  
Support™**

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# Ana's story

<https://youtu.be/6o0nGUW8VSE>



**HOPE.**



# University of Nebraska Medical Center<sup>SM</sup>

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