

Bites to Bytes: Convergence of Medical Devices and Wearable Tech for Measuring and Modifying Caloric Intake

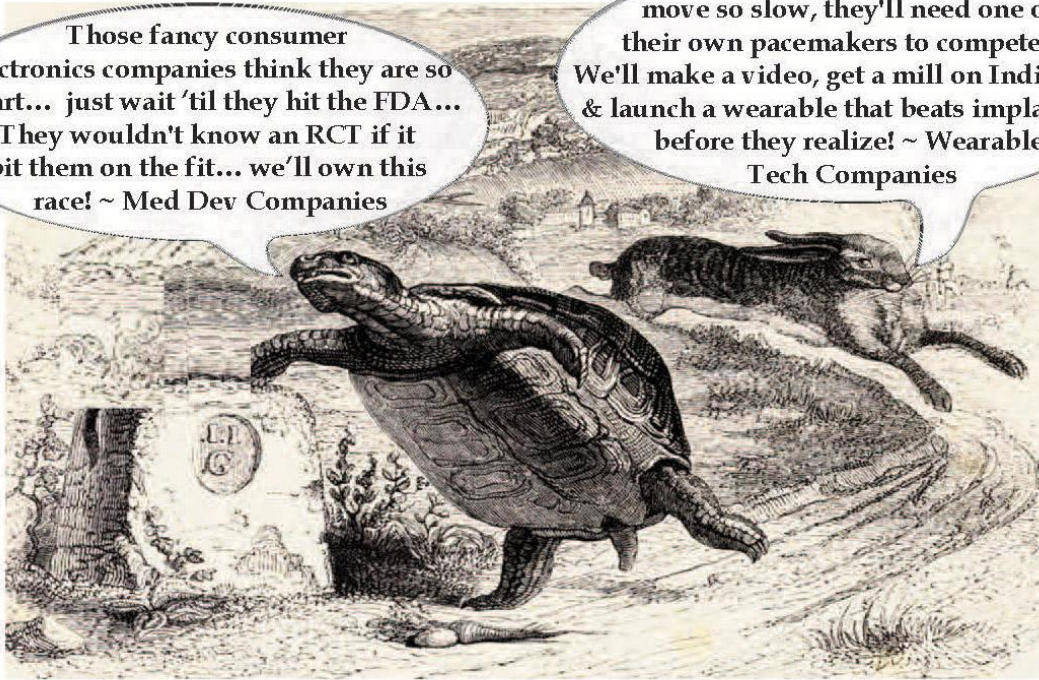
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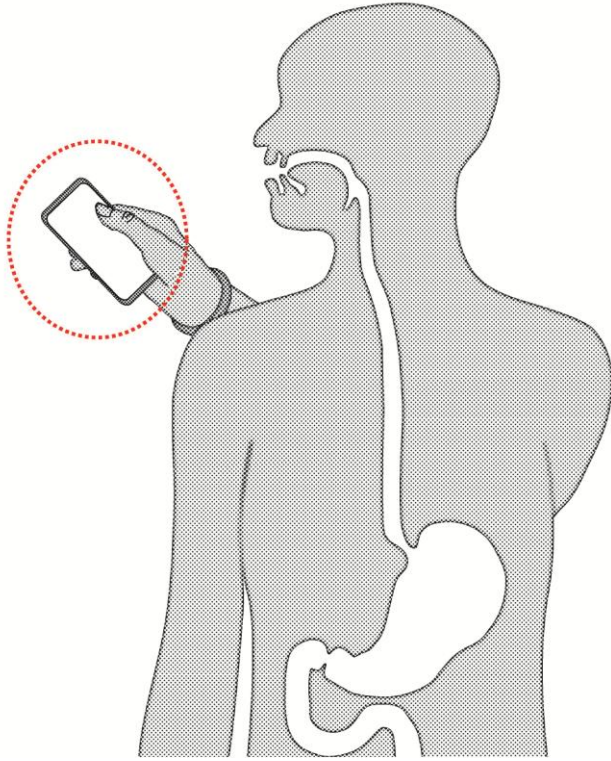


Those fancy consumer electronics companies think they are so smart... just wait 'til they hit the FDA... They wouldn't know an RCT if it bit them on the fit... we'll own this race! ~ Med Dev Companies

Med dev companies move so slow, they'll need one of their own pacemakers to compete... We'll make a video, get a mill on Indiegogo, & launch a wearable that beats implantable before they realize! ~ Wearable Tech Companies



"Grandville tortoise" by Jean Grandville, Licensed under Public domain via Wikimedia Commons

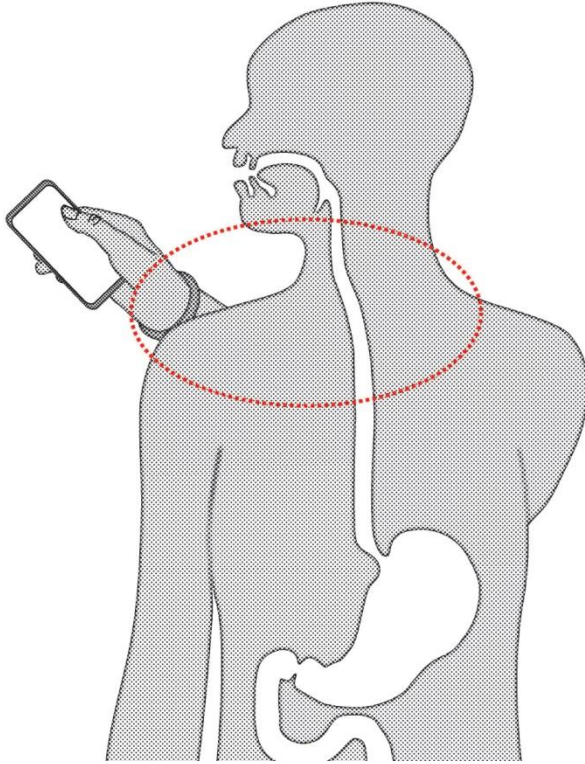


► Nutritional tracking assisted by mobile handheld device

► Options: Manually enter food info. Menu-driven touch or voice interface.

Take picture. Food, package, or UPC recognition. Location aware. History aware. Food-to-Nutrient database. Feedback.

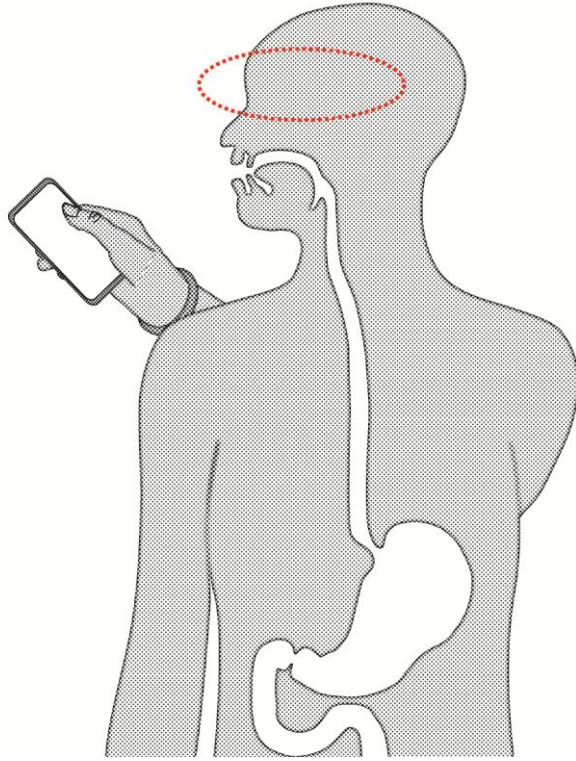
► MyFitnessPal, MakeMyPlate, Weight Watchers, Purdue Research Foundation, FastFood.com, Consumer Physics/SCIO, Tellspec, HapiLabs/Fork



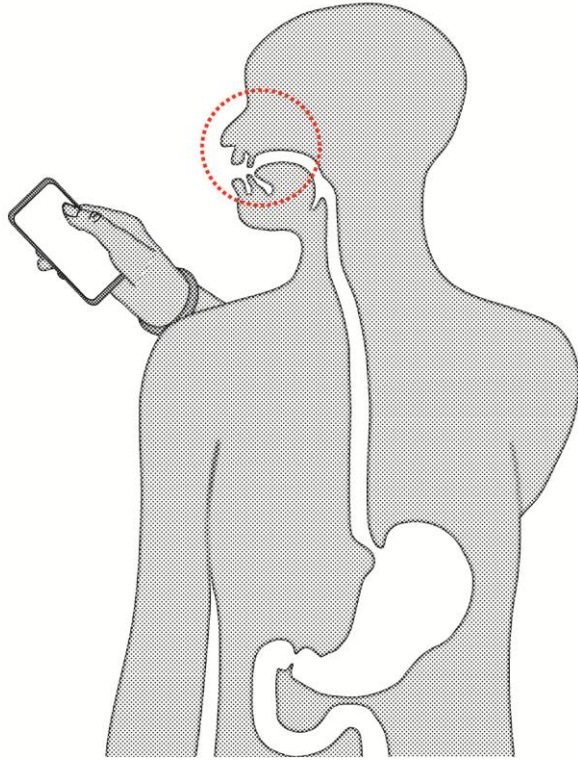
► Nutritional tracking assisted by wrist, arm, or neck wearable device

► Options: Manually enter food info? Menu-driven touch or voice interface? Take picture? Food, package, or UPC recognition? Plus eating detection and/or food identification by motion/gesture, sound, optical/spectroscopy, electromagnetic sensor? Sensor trigger sequence?

► Jawbone/BodyMedia/AliphCom, Fitbit, Bite Technologies [Clemson], Healbe GOBE, Medibotics/Willpower Watch, AIRO Watch, Pittsburgh/eButton, WearSens

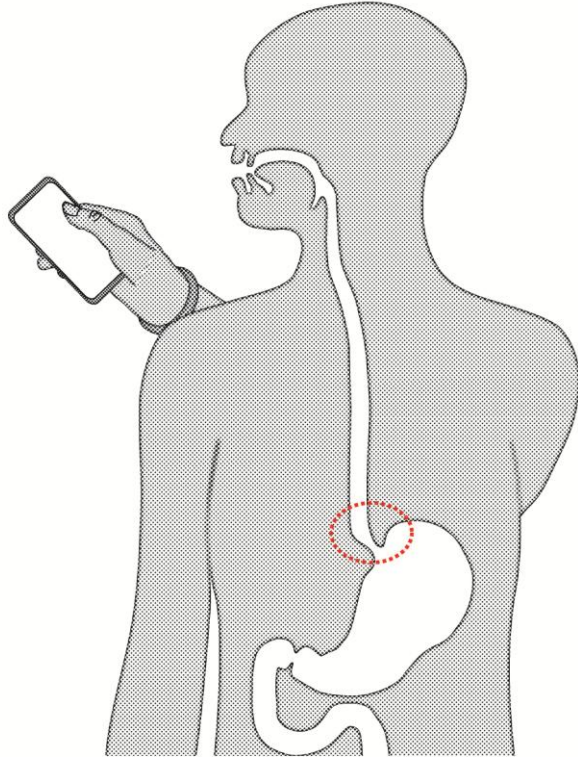


- ▶ Nutritional tracking (and modification?) assisted by eyewear, earwear, and/or EEG monitor?
- ▶ Options: Manually enter food info? Menu-driven voice interface? Take picture? Food, package, or UPC recognition?. Plus eating detection and/or food identification by motion/gesture, sound, optical/spectroscopy, electromagnetic (EEG?) sensor? Sensor trigger sequence? Behavior modification by info display, AR, neurostim?
- ▶ BitBite, Valencell, Hypo-Safe, Google/Novartis Glucose Lens, Interaxon/Muse, Medibotics, LifeFuels(?)



- ▶ Nutritional tracking (and modification) with intra-oral or intra-sinus device. Attached or implanted? Upper palate? Dental appliance? Fluid or gaseous communication with mouth or sinus?
- ▶ Options: Eating detection and/or food identification by chemical analysis, spectroscopy, motion sensor, neural signals from taste buds or olfactory cells? Behavioral modification by modification of taste or smell? Substance released? Neurostim?

▶ Medibotics

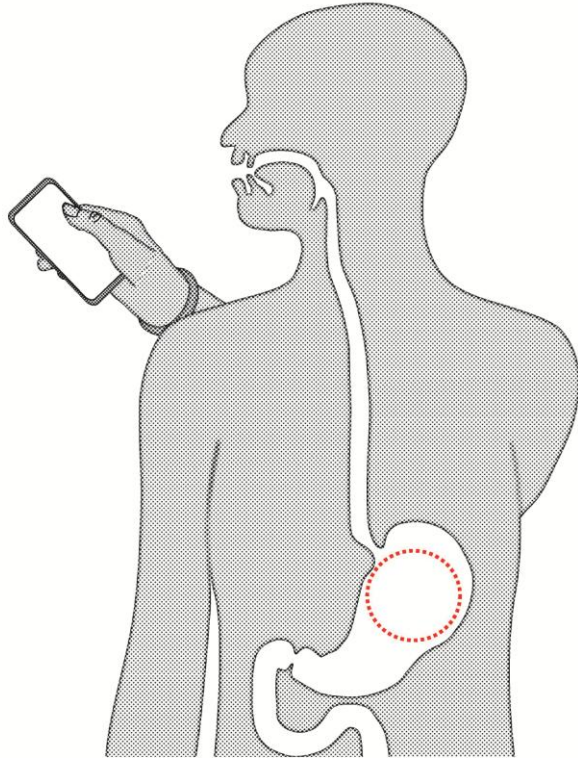


► Nutritional modification
by gastric band

► Indiscriminately restricts any
type of food from entering stomach
based on size/shape of food bolus.

FDA approved, but now largely
discontinued? Improperly used or inherent
problems with tissue necrosis and
indiscriminate food restriction?

► Apollo Endosurgery, Johnson &
Johnson/Ethicon, Agency for Medical
Innovation, Bariatec Corporation, Bariatric
Solutions, CAVU Medical, Cousin Biotech,
Sentinel Group, Silimed, Torax Medical



► Nutritional modification by intragastric balloon, expanding pills, or other intragastric volume-filling device

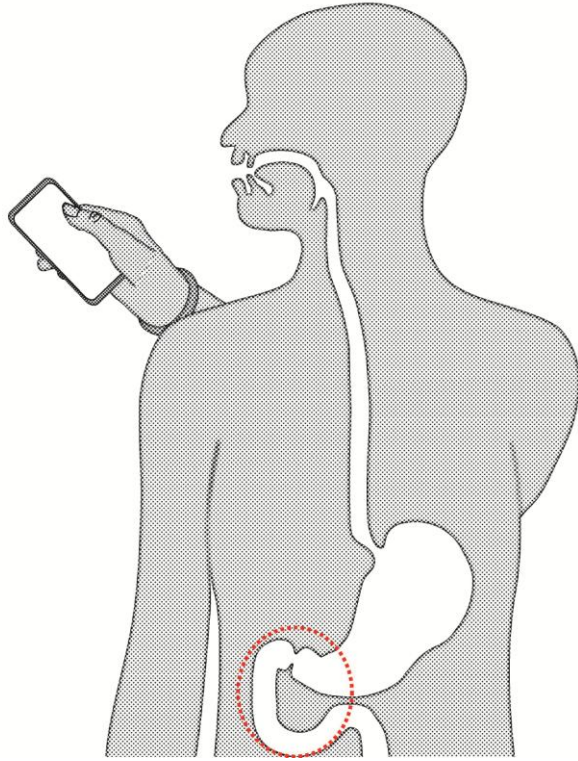
► Expanded in stomach.

Feeling of fullness?

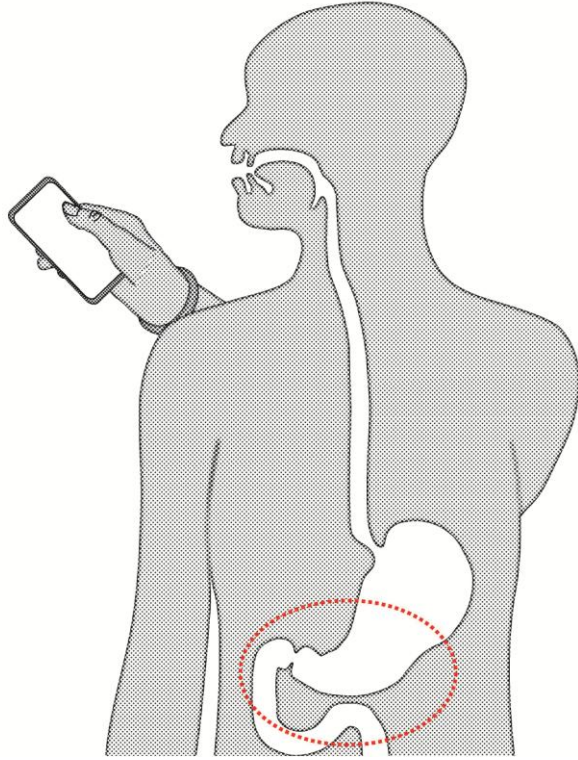
Stomach expands even more?

Lasting or temporary effect?

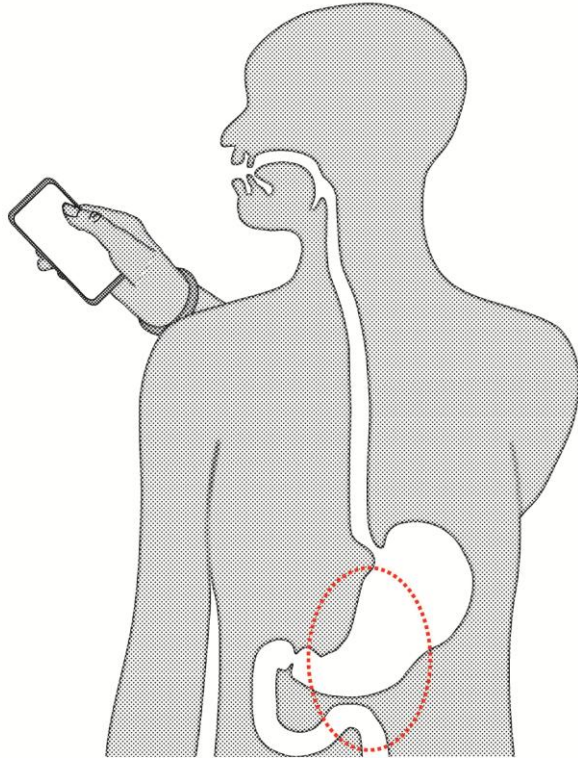
► Allurion/SGL Medical, Apollo Endosurgery, BAROnova, BFKW LLC, Boston Scientific, EndoSphere, Fulfillium, Gelesis, Helioscopia, Obalon, Onciomed, Pavilion Medical, ReShape, SatiSphere/EndoSphere, Silimed, Spatz Medical



- ▶ Nutritional modification
by gastrointestinal sleeve
- ▶ Material forms barrier between food and
absorption organelles in intestine.
Reduces nutrient absorption.
Does not discriminate between
different types of food?
Lasting or temporary effect?
- ▶ GI Dynamics/Endobarrier, MetaModix,
ValenTx, Duocure, Endonetics, Ibis Medical

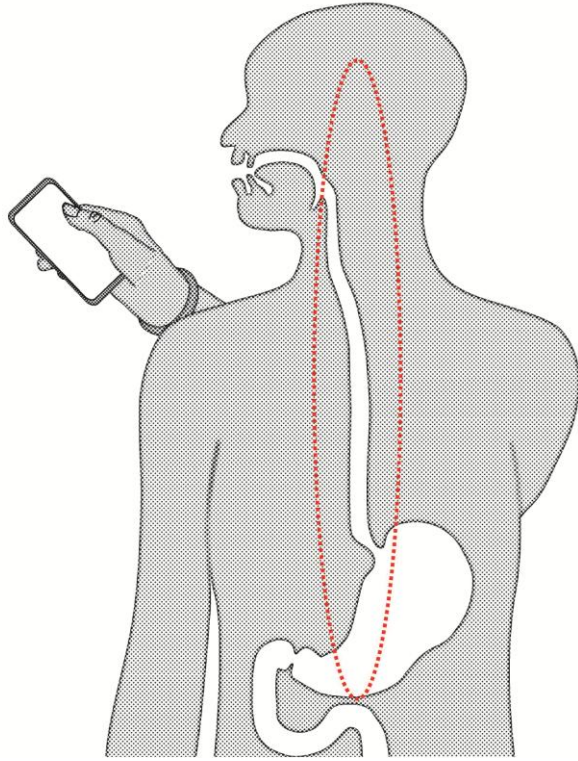


- ▶ Nutritional tracking and modification assisted by adjustable absorption-modification device
- ▶ Device releases substance into gastrointestinal tract which modifies nutritional absorption by coating food or intestine. Device can selectively release substance during consumption of unhealthy type or quantity of food.

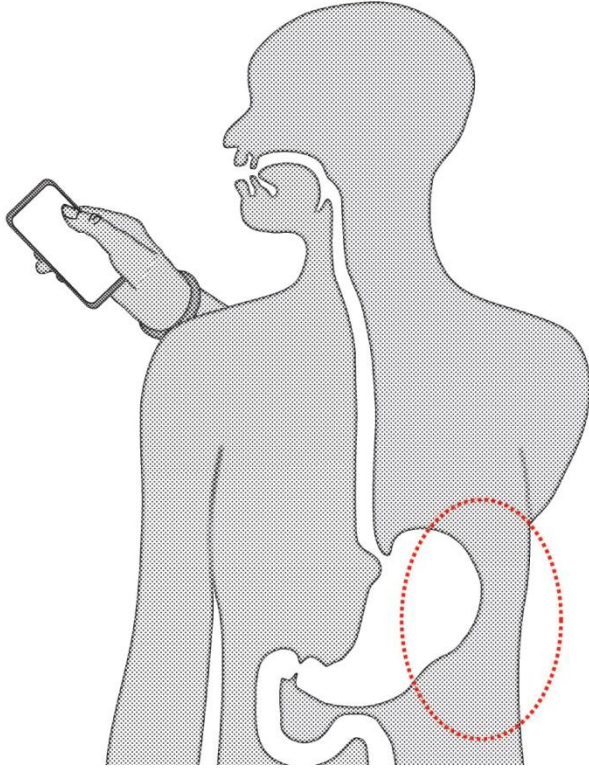


► Nutritional tracking and modification assisted by (AGB) Adjustable Gastrointestinal Bifurcation

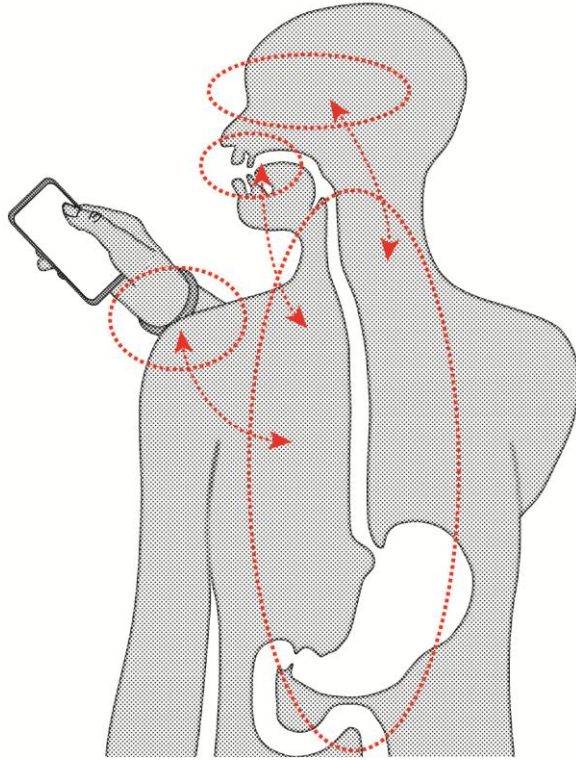
► Like gastric bypass surgery, creates a short-cut from stomach to a downstream portion of intestine, but unlike traditional gastric bypass, maintains original pathway and selectively sends different types of food (via adjustable valve) through the short or long route. Healthy food through longer (full absorption) route. Unhealthy food through shorter (lower absorption) route.



- ▶ Nutritional modification by neurostim/blocking
- ▶ Stimulates and/or blocks neural signals (eg. Vagus nerve) between brain and stomach. Stomach does not prepare for food. Different neurostim or blocking based on whether person is eating? Density of food? Future: Type of food?
- ▶ EnteroMedics VBLOC/Maestro, IntraPace/Abiliti, Medtronic/Transneuronix, St. Jude/ANS, MetaCure, Beta-Stim, EndoVx, Medibotics, Leptos



- ▶ Some other implantable approaches to nutritional intake modification
- ▶ Stomach emptying tube/pump --
Aspire Bariatrics
- ▶ Extragastric volume-filling device
to resist stomach expansion --
Vibrynt/Exploramed

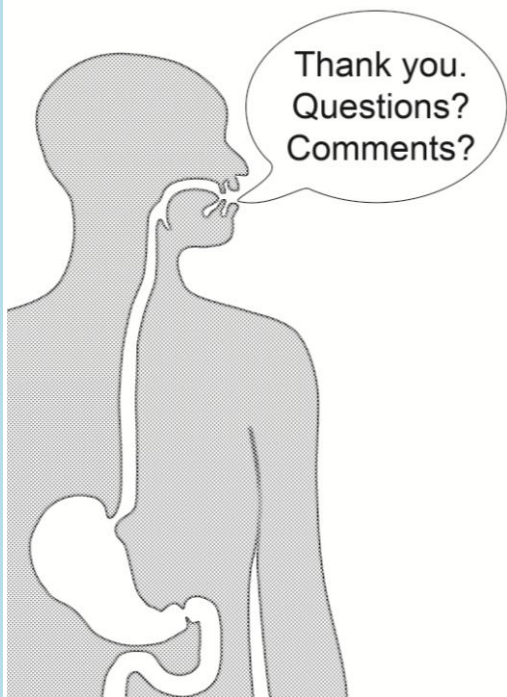


► What is the future of nutritional intake monitoring and modification? Convergence and integration of wearable and implantable devices?

► Smart devices identify and differentiate between healthy and unhealthy types and quantities of food?

► External (wearable) devices and implantable devices work together for smart food identification and nutritional intake modification? Not just reduced caloric intake -- healthier nutritional intake.

► the "JawTone"? the "FitBite"?
the "Apple [a day] Watch" ? ☺



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