

[CI1] A WAY TO MONITOR THE FULLNESS OF THE BLADDER AND/OR TO ALLOW BLADDER DRAINAGE DURING URETEROSCOPY AND RENOSCOPY PROCEDURES

BY DR DANIEL YONG ZHAN PENG ASSOCIATE CONSULTANT, TTSH;

REPRESENTED BY DR CHONG WEILIANG, SR RESIDENT, TTSH

ISSUES WITH A FULL BLADDER DURING ENDOUROLOGICAL PROCEDURES

Problem with Full bladders

- causes pain and physiological changes during procedures
- Can make advancement of equipment pass intramural ureter difficult

During prolonged procedures full bladders can occur

- Small feeding tubes are inserted along the scopes to empty the bladders

Stakeholders

- Patients – pain reduction and reduction in vagal effects
- Surgeon – reduce operative time and need to empty the bladder manually

Prevalence

- Almost all prolong endourological procedures (ureteroscopy and laser lithotripsy, retrograde intra renal surgery)

PAIN POINTS

A stop gap measure is to insert a feeding tube along the ureteroscope or access sheath

Sometimes this is not successful as there is insufficient space to accommodate an extra catheter

Another method is to remove all equipment and manually empty the bladder which is time consuming

IMPACT OF SOLUTION

A new modification to the access sheath can allow for immediate bladder draining without using cumbersome adjuncts

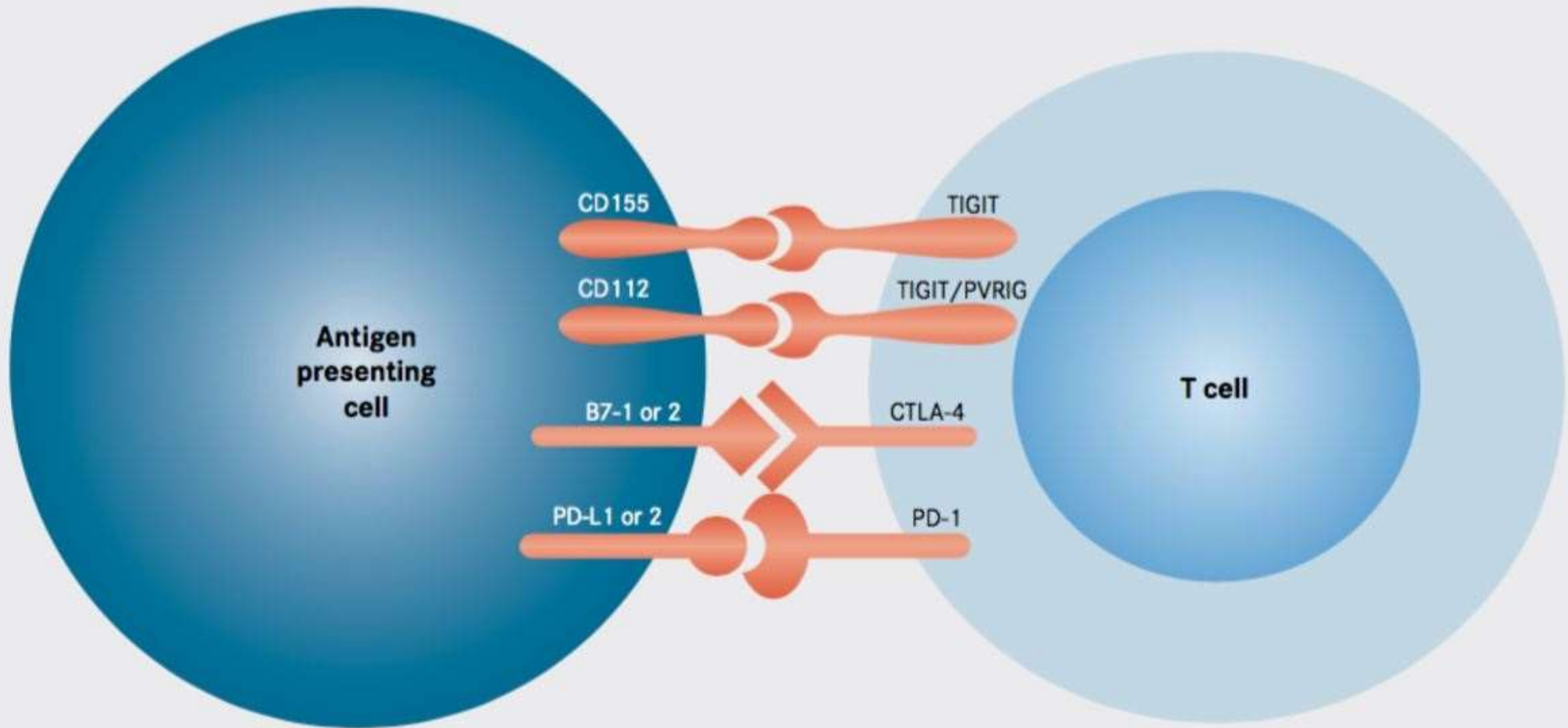
It will also automatically decompress the bladder, not allowing it to get overly distended, causing pain to the patient or vagal effects

Pain and vagal stimulations are detrimental to the patient

[CI2] A point-of-care test kit for metastatic renal or urological cancers

By Dr Chong Weiliang (Registrar) and Dr Daniel Yong (Assoc Consultant), TTSH

Taking the Guess Work Out of Cancer Care



- Cancer: Leading cause of death in Singapore
- Afflicts 1 in every 4 adults
- Many still develop metastatic disease
 - At presentation
 - After definitive treatment
 - Surgery
 - Radiotherapy
 - Chemotherapy
- Immune check point inhibitors
 - The next big thing for metastatic cancers!
 - Renal Cell Carcinomas
 - Melanoma
 - Lung cancers
 - Etc etc
 - A lifesaver in many once deemed terminal cases
 - Myriad of new immune check point inhibitors available in the market
 - Pembrolizumab
 - Nivolumab
 - Avelumab
 - Ipilimumab

- BUT...
 - Which agent to start?
 - Best guess at the moment
 - Based on international guidelines and large scale studies
 - Not personalised care
 - Exceedingly costly
 - “One and only chance” situation
- If only we could better predict which agent would bring about the best clinical response in a given patient
 - Save time
 - Save money
 - Potentially reduce burden on society as a whole
 - Patients and family can potentially be more willing to pay for the “best shot”

- Stake-holders
 - Cancer patients with metastatic disease, along with their family
 - Wasted time
 - Loss opportunity
 - Financial toxicity
 - Emotional rollercoaster ride
 - Medical team
 - Emotional strain
 - At a lost as to what to do especially during late stage disease
 - Society as a whole
 - The strain on resources to care for terminally ill patients
 - Many a times, a loss of a financially capable person



- Courtesy of Today Online

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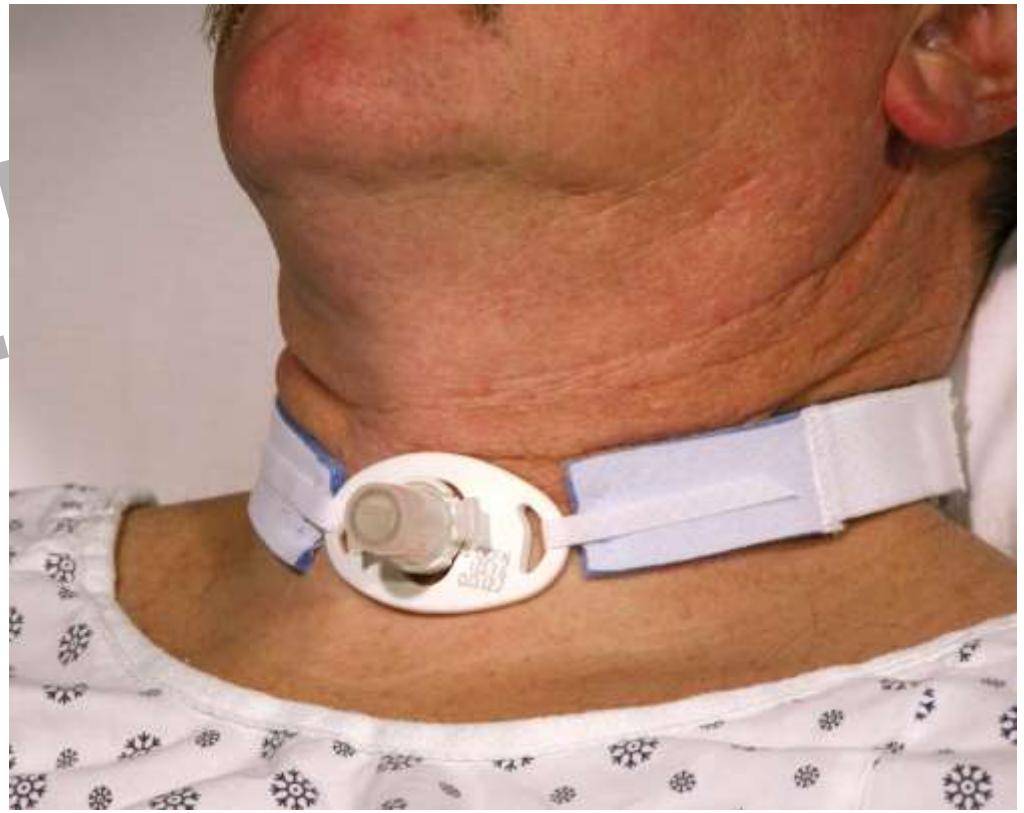
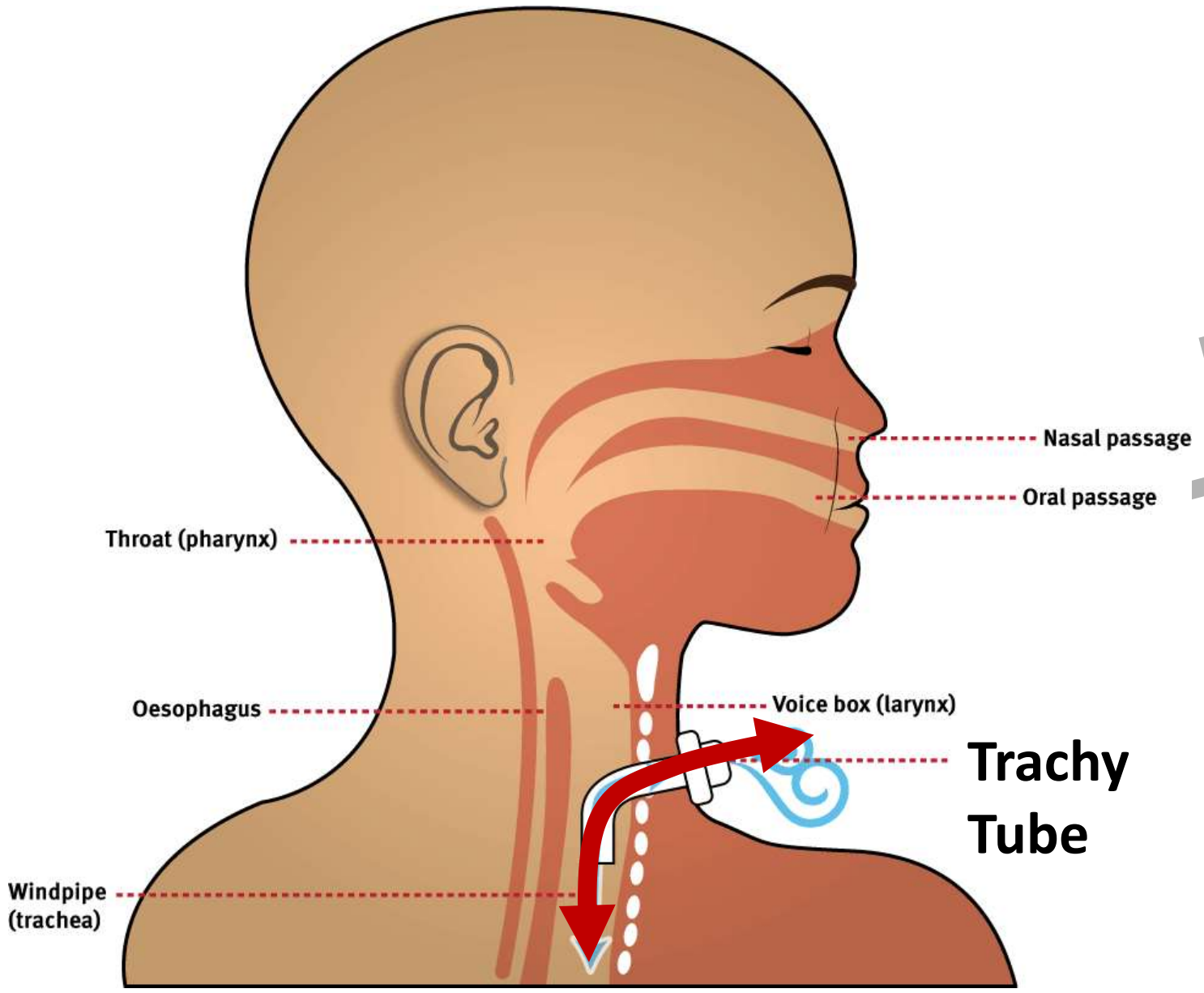
CI3 A Solution to Lessen the Likelihood of Tracheostomy Tube Valve Accidentally Dropping and Being Misplaced

Florence Tang, Melinda Lim
Speech Therapy Department
Tan Tock Seng Hospital

Description of problem

1. Some patients with severe medical conditions require alternative ventilation via a tracheostomy, where a tube is placed in the neck to create an artificial airway.

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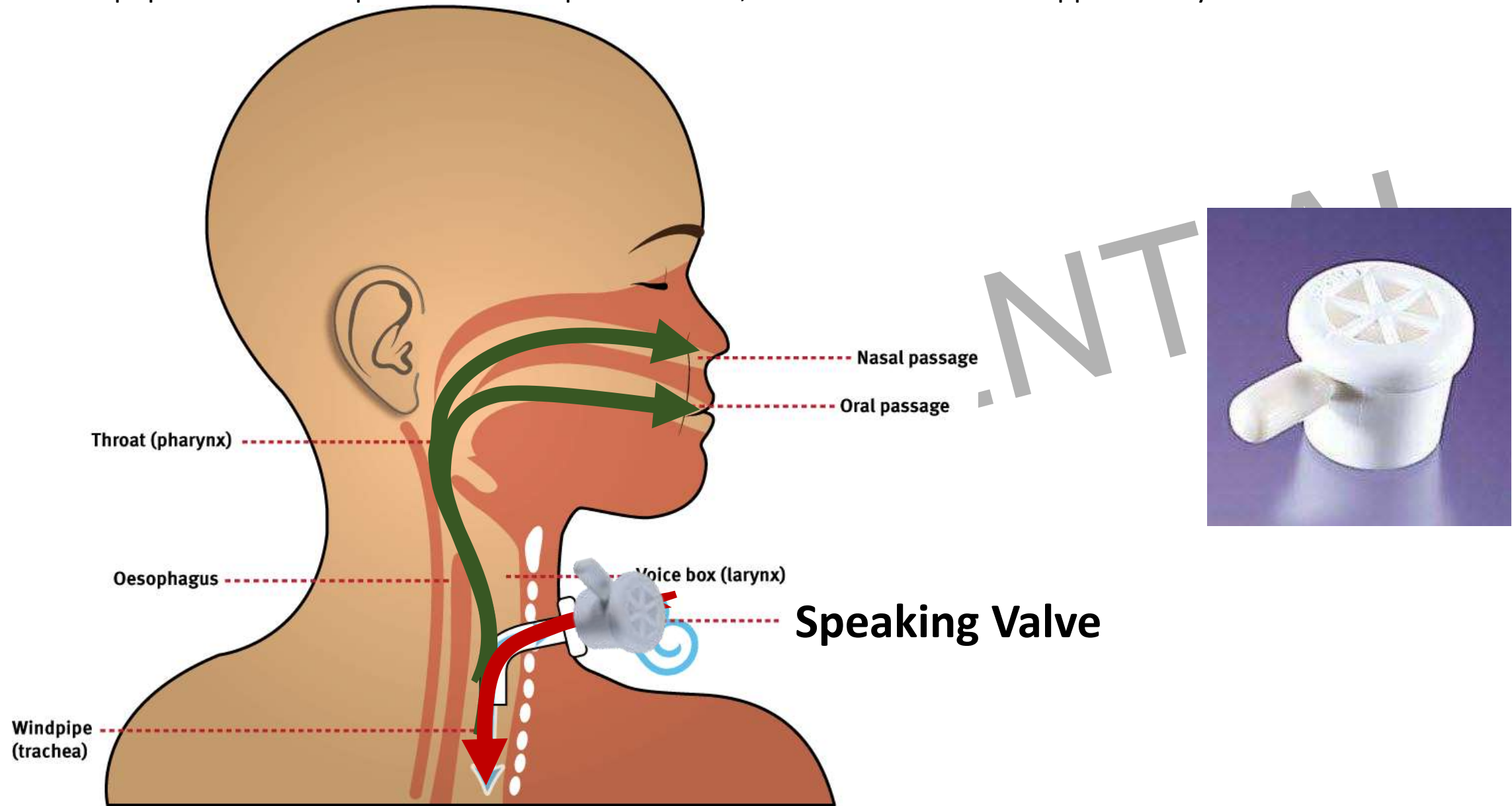


Description of problem

1. Some patients with severe medical conditions require alternative ventilation via a tracheostomy, where a tube is placed in the neck to create an artificial airway.
2. Speech therapists use speaking valves with tracheostomised patients to help restore airflow to the mouth and nose for speech, swallowing and possibly tracheostomy weaning.
3. The speaking valve is a small one-way valve placed over the opening of the tracheostomy tube. For the patient's safety, the valve pops off if there is pressure build-up underneath, such as when there is upper airway obstruction.

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4. In some cases, the speaking valve may pop off while patients are talking or coughing. They may fly a fair distance away leading to accidental speaking valve loss.
5. In the busy ward environment, it is not always easy to locate a lost speaking valve.
6. At present, there are no commercially available attachments to prevent such accidental losses of speaking valves.

Problem statement / Title

A solution to lessen the likelihood of tracheostomy tube valve accidentally dropping and being misplaced

Pain points

1. Accidental speaking valve loss causes inconvenience to all parties involved.
2. Patients lose the therapeutic benefit of having a speaking valve until it is replaced.
3. Speech therapists and nurses spend time searching for the device or dealing with the administrative aspects of its replacement. These hours could be better spent in patient care.
4. As most of the patients requiring tracheostomy also require assistance for most daily activities, the cost of speaking valve replacement usually falls on the wards, putting a strain on nursing managers' already-tight ward budgets.
5. There is no commercially available solution to prevent this. An ideal solution must be low-cost, easy to clean, and must not impact the performance of the speaking valve.

Scale of problem / Impact of solution

1. At Tan Tock Seng Hospital alone, approximately 80-100 speaking valves are prescribed per year. Of these, 4-5 are accidentally lost.
2. The National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) study estimates that 12,000 people are tracheostomised per year.

What you need from external partners

Support to refine the prototype, with channels for marketing this solution to other hospitals in Singapore and/or the region.

[CI4] A non-pharmacological method for prevention and treatment of peripheral neuropathy

By Dr Eugene Fan
Consultant, TTSH

Problem statement: A non-pharmacological method for prevention and treatment of peripheral neuropathy

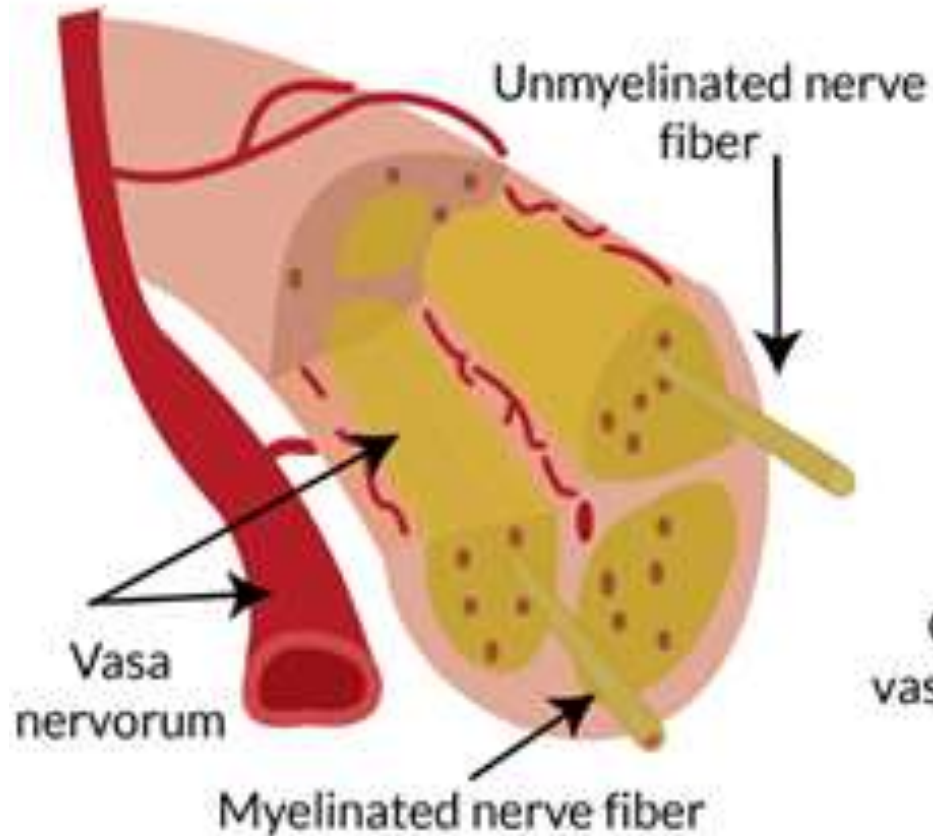
Description of problem

1. Peripheral neuropathy is damage of the peripheral nerves
2. The top 2 known commonest causes are Diabetic neuropathy (60%) and Chemotherapy induced neuropathy (10%)

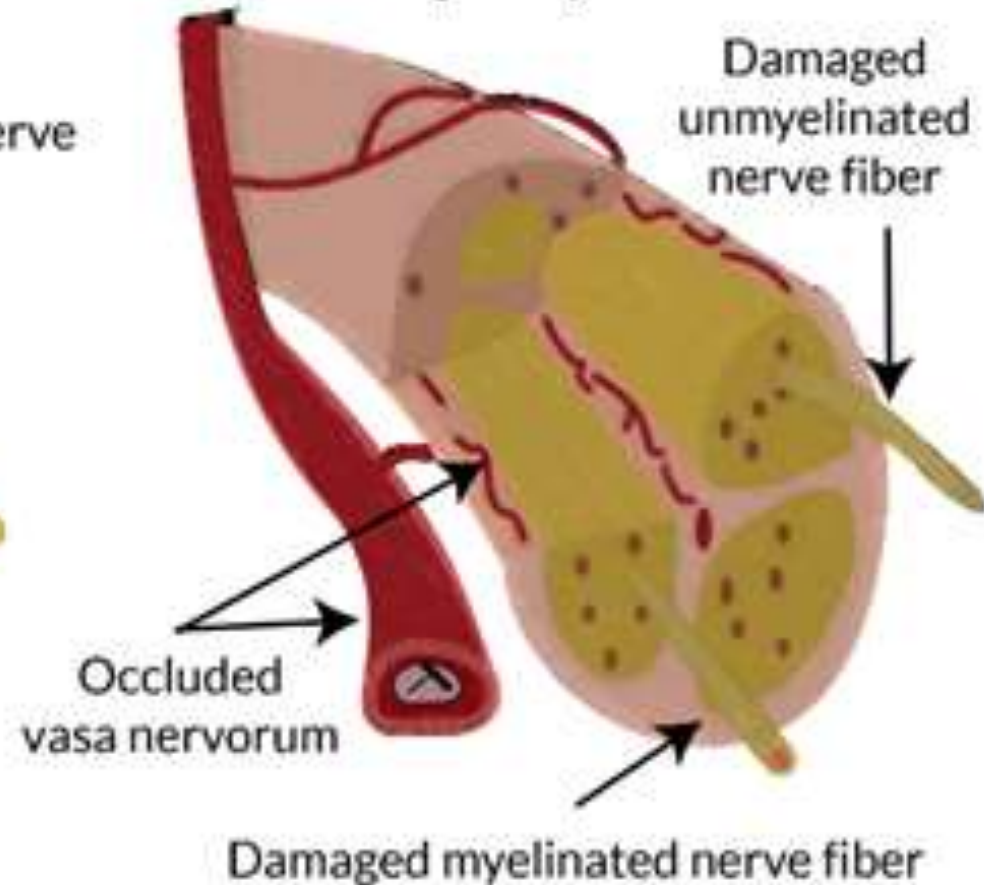


Diabetic Peripheral Neuropathy

Healthy Nerves and Blood Vessels



Nerves and Blood Vessels Damaged by DPN



1



Numbness,
especially in arms
and legs

2



Stabbing pain

3



Burning pain

4



Sensitivity
to touch

5



Coordination
difficulties

6



Muscle weakness

7



Bladder/bowel
problems



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Pain Points

1. Majority of diabetic neuropathy/chemotherapy induced neuropathy is sensory loss, and only a small fraction of patients with DN/CIN have painful symptoms.
2. There is **no available solution** for sensory neuropathy.
3. For patients with painful diabetic neuropathy, drug therapy can be considered.
4. Chemotherapy induced peripheral neuropathy and diabetic peripheral neuropathy have **unsatisfactory treatment solutions, mostly pharmacological**, which can only reduce patient symptoms as long as the medications are taken.
5. Drug therapies are associated with **multiple side effects** including somnolence, lethargy and increased risk of falls.

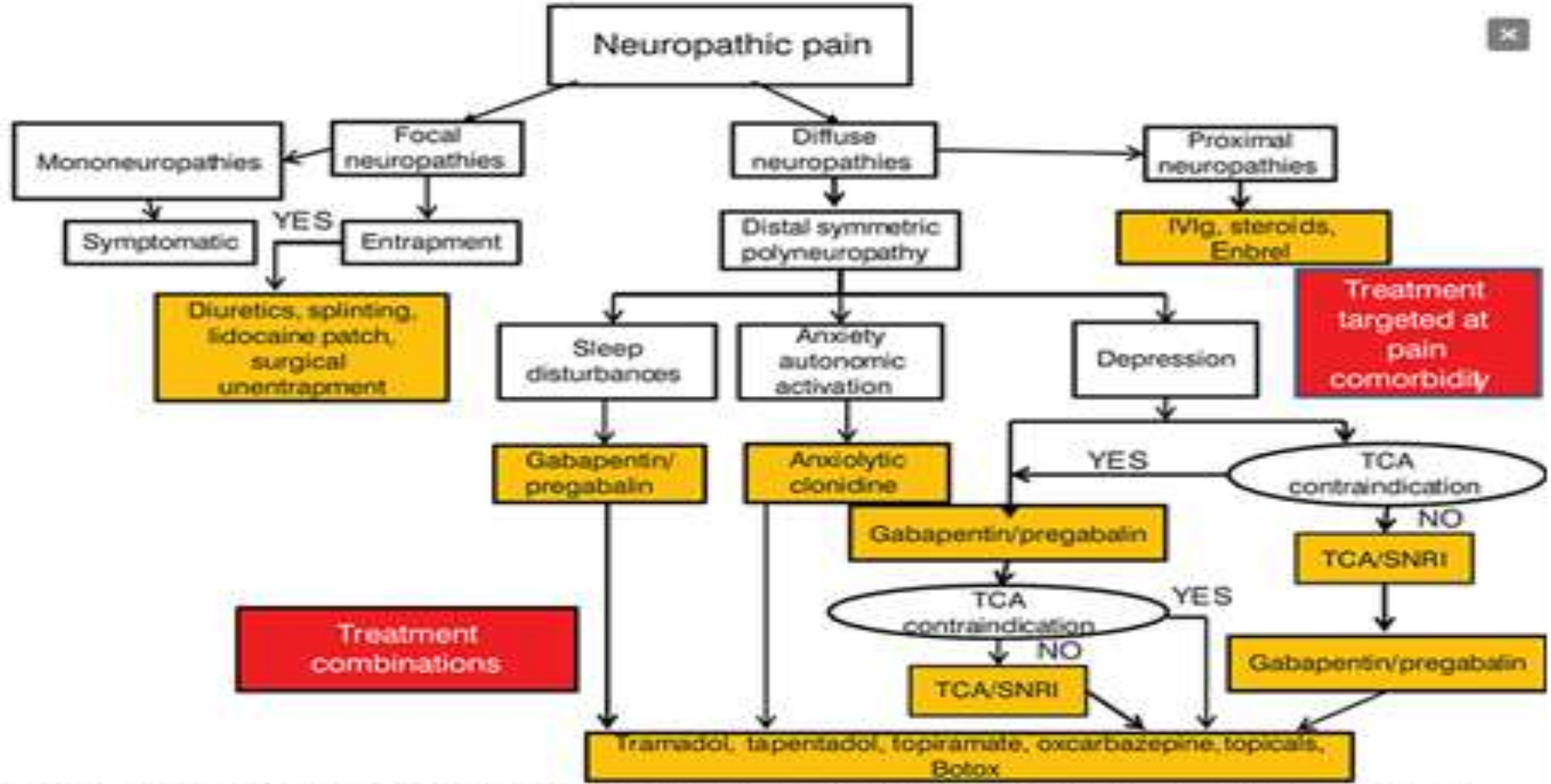


Figure 1. Treatment algorithm: neuropathic pain after exclusion of nondiabetic etiologies and stabilization of glycemic control.

Abbreviations: IVIg, intravenous immunoglobulin; SNRI, serotonin-noradrenaline reuptake inhibitors; TCA, tricyclic antidepressants.

NON PHARMACOLOGICAL INTERVENTION

Intervention	Comments	LOE/GOR	Reference
Physical exercise	Several strategies are available: eg. supervised medical exercise (sensorimotor function, endurance, strength of flexibility), self-management interventions (eg. EXCAP [®])	II, B	Kleckner 2018, Jordan 2017
Acupuncture	mostly uncontrolled or underpowered studies	II, C	Franconi G, plement Altern Med 2013; Bao Euro J Cancer 2018
Scrambler therapy	Non-invasive cutaneous electrostimulation.	III, C	Pachman, D SCC 2015, Loprinzi ASCO 2018
Neurofeedback	pilot study in 71 cancer survivors, potential benefit for electroencephalogram (EEG)-based neurofeedback	II, C	Prinsloo S, J Pain Symptom Manage 2018)
Self guided online cognitive behavioural strategies	Proactive Self-Management Program for Effects of Cancer Treatment, pilot RCT (n = 60), greater improvements in "worst" pain than usual care	II, C	Knoerl 2018
Spinal cord stimulation	small number case series, only in truly refractory pain due to CIPN, invasive and expensive procedure: electrode insertion into the dorsal re-entry zone of spinal cord and pulse generator implantation under the skin	V, C	Majithia, N Oncology Journal 2016

EXCAP[®]: Exercise for Cancer Patients, RCT randomized controlled trial

Scale of problem

The market will be **ACCELERATING** growing at a **CAGR** of close to

4%



INCREMENTAL GROWTH

\$287.60 mn

2017

2022

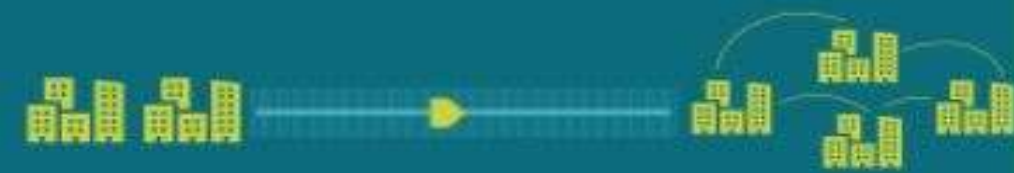


The year-over-year growth rate for **2018** is estimated at

3.36%



The market is **HIGHLY FRAGMENTED** with many players occupying the market share



40%

of the growth will come from the **AMERICAS**

One of the **KEY DRIVERS** for this market will be the rising awareness of peripheral neuropathy



READ THE REPORT:

GLOBAL PERIPHERAL NEUROPATHY TREATMENT MARKET 2018-2022

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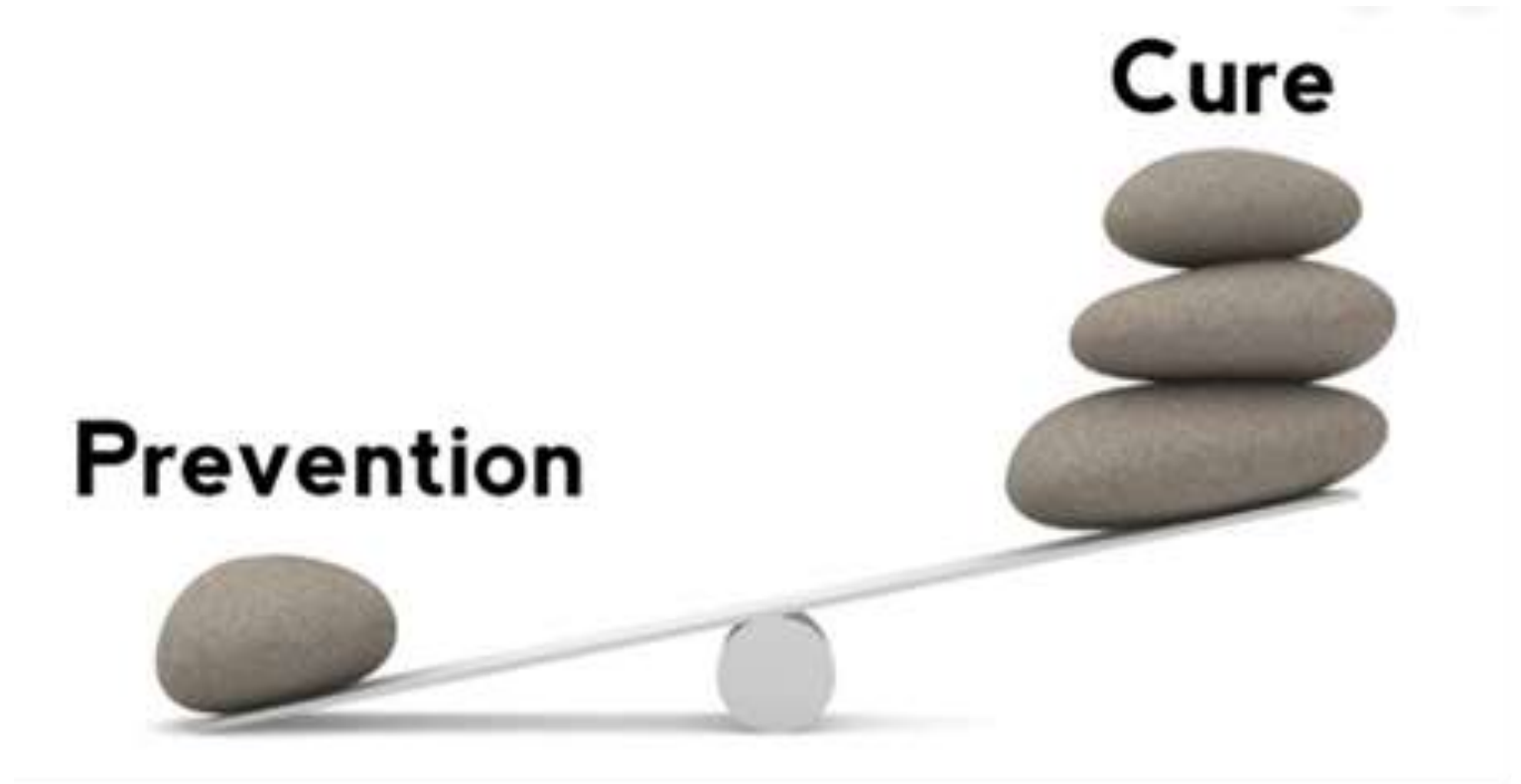


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Talk to us

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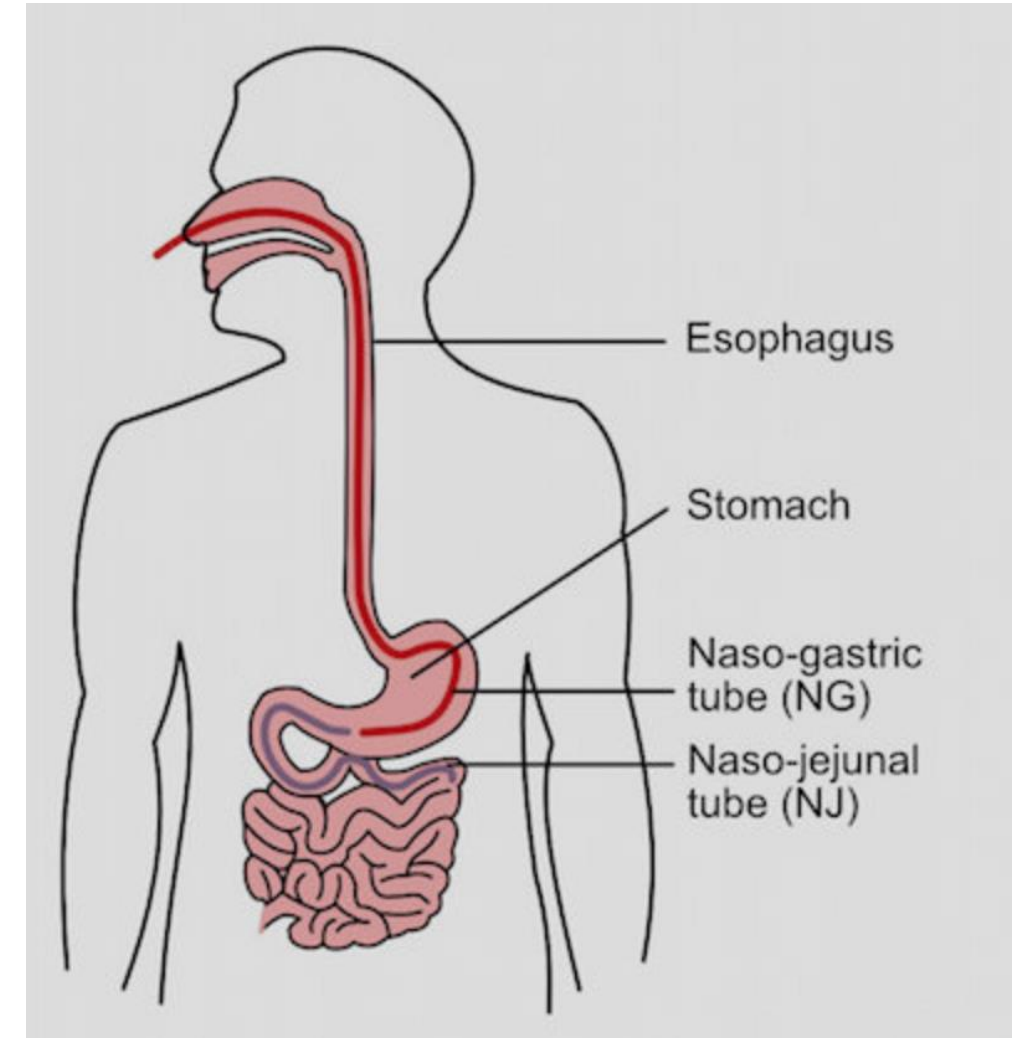
[CI5] Re-inventing the nasogastrojejunal (NGJ) tube to minimize slippage and blockage

By Dr Danson Yeo,
Associate Consultant, TTSH

Re-inventing the nasogastrojejunal (NGJ) tube to minimize slippage and blockage

Description of problem

- Naso-gastric/jejunal tube is a dual lumen tube that allows for
 1. gastric decompression
 2. enteral feeding
- Indications
 1. Delayed gastric emptying
 2. Ileus
 3. Antral/pyloric tumours
 4. Gastric outlet obstruction
- Problems with the current tubes
 1. Kinking/clogging of the tubes – 56%
 2. Accidental slippage of tube – 24%
 3. Delay in re-insertion leads to delay in enteral feeding



Re-inventing the nasogastrojejunal (NGJ) tube to minimize slippage and blockage

Pain Points

Kinking/clogging of the tubes – 56%

- Blockage usually due to particulate medications/feeds
- Need to be flushed with water regularly
- NGJ tubes more prone to blockages as each lumen is smaller than a single-lumen tube of the same size

Accidental slippage of tube – 24%

- Tube is anchored to the nose with tape
- Tape may loosen when the patients perspire
- Accidental pull on the tube during movement/sleep

Re-inventing the nasogastrojejunal (NGJ) tube to minimize slippage and blockage

Scale of problem / Impact of solution

Average 30-50 NGJ tubes per year

What you need from external partners

Redesign of the tube to ensure

1. Prevent migration of the tube while ensuring patient comfort
2. Reduce the chance of tube blockage

[C16] An electric dental root planing instrument to make root planing procedures more efficient

Presenters:

Dr. Priscilla Chao Jang Shing, Dental Surgeon, NHGP

Ms. Tang Wei Qi, Executive, NHGP

What is gum disease?



Photo Credit: <https://www.saebo.com/wp-content/uploads/2017/06/periodontal.png>

Prevalence

- **85%** of the adults have signs of mild to moderately severe forms of gum disease¹.
- **51%** of Singapore citizens spend 25 to 44 years of their entire lives with gum disease¹.
- Periodontitis is the **6th most prevalent disease in the world**².

References

1. Society of Periodontology Singapore (2016), Do I have gum disease?, Retrieved from <https://www.perio.org.sg/do-i-have-gum-disease/> on 2 Aug 2019
2. Society of Periodontology Singapore (2016), What is gum disease?, Retrieved from <https://www.perio.org.sg/what-is-gum-disease/> on 2 Aug 2019
3. American Academy of Periodontology (2019), Diabetes and periodontal disease, Retrieved from <https://www.perio.org/consumer/gum-disease-and-diabetes.htm> on 2 Aug 2019

Gum disease and its impact on general health^{3,4}

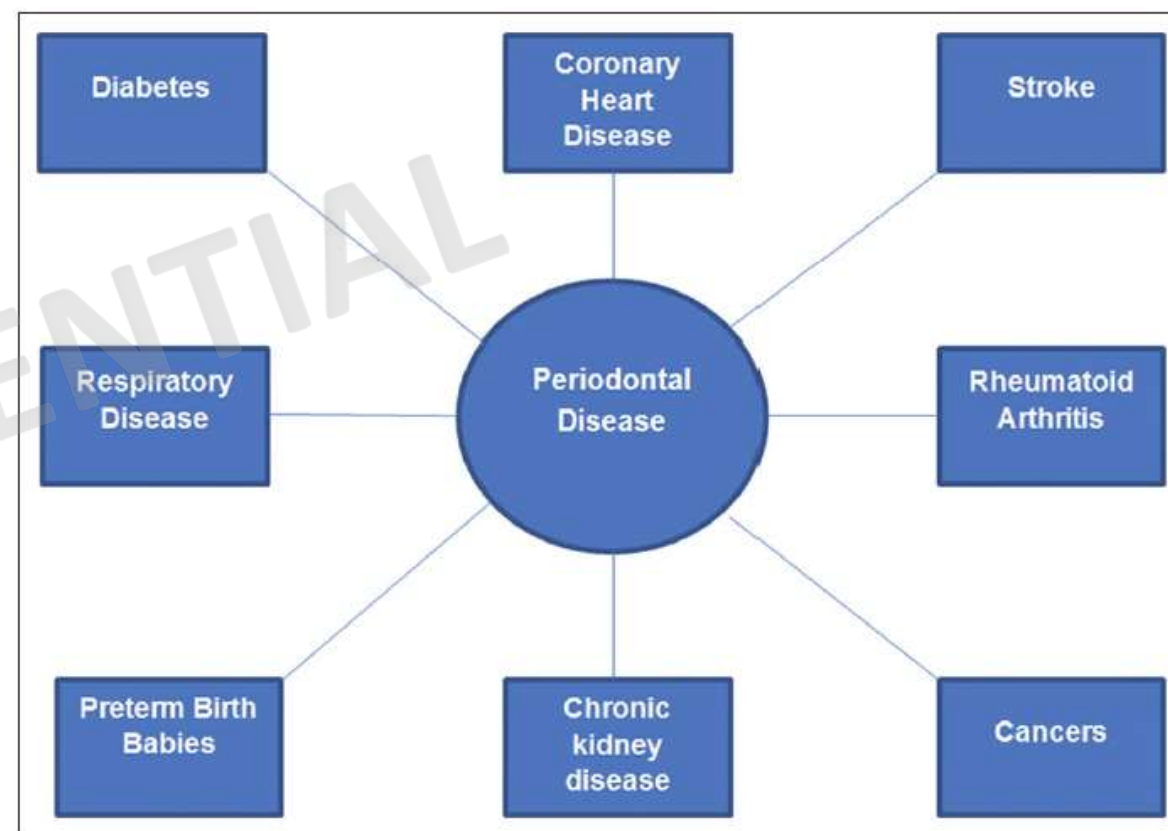


Figure 4: Association between periodontal disease and various systemic conditions

Photo Credit: Nazir (2017), Prevalence of periodontal disease, its association with systemic diseases and prevention, *International Journal of Health Sciences*, Vol 1, Issue 2, pp. 72-80

Current Treatment

1. The treatment for gum disease very often involve **root planing** which is the use of special instruments to remove tough calculus and bacterial deposits along the root surfaces.
2. Currently root planing is done via hand instruments called **curettes**.

<https://youtu.be/bxcilmjYD9E>



Photo Credit: <https://i.ebayimg.com/images/g/chgAAOSwn7JYEM~E/s-l300.jpg>

Pain Points

1. Time consuming
 - Patients will need to open their mouths for long duration
 - May need multiple visits to complete a full-mouth cleaning
 - Long waiting list at specialist centres
 - Clinicians suffer from neck, back, and hand pain
2. **Varying force during root planing**
 - Not enough force > Unremoved calculus will hinder healing, leading to poorer clinical outcome
 - Too much force > Damage to root surface

Problem statement / Title

An electric dental root planing instrument to make root planing procedures more efficient

Scale of problem

Waiting time to see a gums specialist/oral health therapist is currently about 3 months on average

Impact of solution

1. Save time
 - **Reduce fatigue** for both clinician and patient
 - **Reduce in number of visits** for the full mouth root planing
 - **Reduce the waiting list** for patients with gum disease in specialist centre
 - **More timely access to care** for patients
2. A **more controlled force** in root planing will ensure complete removal of calculus along root surfaces while guarding against damage to the root.
3. The innovation has **market in Singapore and overseas dental industry.**

What you need from external partners

Company that can develop more efficient instruments for performing root planing, to reduce treatment time and/or operator fatigue.

Technical requirements

- Reusable
- Undergo chemical cleaning & sterilisation

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[C17] Multi-purpose laparoscope with sponge or blood suction system

By Dr Aung Myint Oo, Consultant, TTSH

Description of problem

1. Nearly 15 million laparoscopic procedures were performed every year globally and the US alone contributed 32% of the volume and increasing yearly.
2. The overall laparoscopy and endoscopy devices market was worth 18.39 billion and is growing with compound annual growth rate (CAGR) of 4.8% in the forecast period, 2018-2025
3. During the laparoscopic surgery bleeding can obscure the operative field and thus surgeon may not be able to continue surgery safely.
4. Gauze/ Surgical sponge can be used to clean the operative field, and also can achieve hemostasis/ slow down the bleeding by compression.
5. These gauze , surgical sponge can also be used to press, retract the delicate tissue, vessels protecting from injury by laparoscopic instruments.
6. Hemostais, organs retraction without injuring the organs being retracted, clean operative field are very important to achieve the good surgical outcomes.
7. These are the most stressful elements for the surgeons performing the laparoscopic surgeries.

Pain points

- 1. There is the risk of retained sponge or broken sponge during the retrieval which can lead to adverse outcomes.
- 2. We need the better all in one multipurpose spongesystem to address all the issues
- 3. helpful to operating team (nurses and surgeons) as well as patients.

Scale of problem / Impact of solution

- 1. Approximatley 15 million patients undergo laparoscopic procedures worldwide

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What you need from external partners

Company that can develop and the all in one multipurpose hemostatic sponge system for minimally invasive surgeries/.

[C18] A more effortless and pain-free way
to insert x-ray imaging plates under
patients with limited mobility in a lying
position

By Mr. Nurhisyam Bin Norhalim,
Radiographer, TTSH

Problem Statement

A more effortless and pain-free way to insert x-ray imaging plates under patients with limited mobility in a lying position

Description of problem

1. X-ray imaging plates often need to be inserted underneath a patient lying down on their back in a trolley
Chest/Abdominal/Pelvic x-rays. The patients are usually unconscious or with limited mobility.



Images from radiopaedia.org

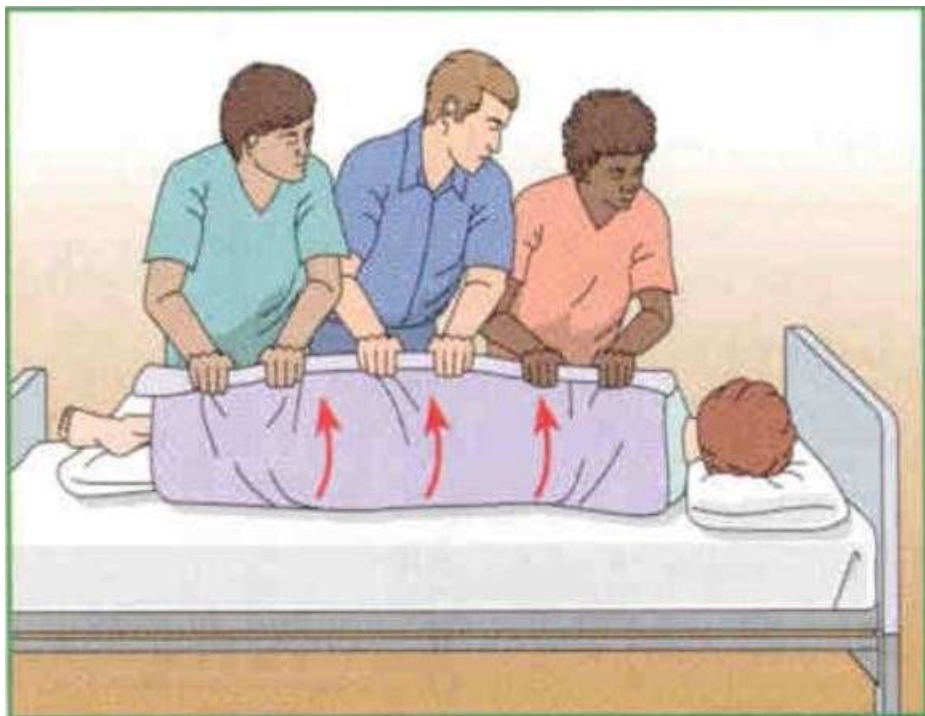
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Problem Statement

A more effortless and pain-free way to insert x-ray imaging plates under patients with limited mobility in a lying position

Description of problem

2. The action of inserting a plate underneath a patient requires the combined effort of the care team. A great amount of effort/exertion by the radiographer is required to insert the plate. The whole process is repeated to remove the same plate after the exam.



Images from Pinterest and TTSH Medical Digest Oct-Dec 2017

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Problem Statement

A more effortless and pain-free way to insert x-ray imaging plates under patients with limited mobility in a lying position

Description of problem

3. An imaging plate is a very hard surface and painful to lie on for bony patients. Current practice is to envelop the plate in a plastic sheet to protect the surface of the expensive imaging plate from fluids before inserting it underneath the patient. A device exists currently in the market to assist in the insertion process but it is extremely expensive and it only serves to make the insertion process easier and act as a waterproof barrier. It does little to reduce friction or make the experience a little more comfortable for the patient.



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Problem Statement

A more effortless and pain-free way to insert x-ray imaging plates under patients with limited mobility in a lying position

Description of problem

4. The incidence of skin tears has affected a great number of patients over the years and it is unacceptable for even one person to be injured by the diagnostic process. Every patient in the ICU and emergency department is affected.



ISTAP Skin Tear Classification System from Foundations of Best Practice for Skin and Wound Management (WoundsCANADA.ca)

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Problem statement

A more effortless and pain-free way to insert x-ray imaging plates under patients with limited mobility in a lying position.

Pain points

1. Requires the combined efforts of several staff members for each exam.
2. Immense exertion by the radiographer to insert the imaging plate exposes them to a greater risk of injury.
3. The insertion process exposes patients with brittle skin to the risk of skin tears.
4. The uncomfortable feeling of lying on top of a hard surface makes a patient who is already in pain due to their affliction even more uncooperative and hampers the exam.
5. The current practice does not address any of these concerns. The existing product in the market is ineffective for the local demographic of elderly patients that come into our hospital.

Scale of problem / Impact of solution

1. 33,614 nurses and 1,739 radiographers registered in Singapore. (MOH Health Manpower Statistics & AHPC Annual Report 2018)
2. 203 reported patient skin tear incidents in 2018 (IRIS Statistics)

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What you need from external partners

Company that can develop alternative solutions and manufacture the new product.