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TOWARDS ZERO RISK OF YOUR TOOTH WRONGLY PULLED OUT!

To Prevent Wrong Tooth Extraction by Enhancing Current Surgical Safety Practices



Main Author
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Introduction

Incidents of wrong site surgery should never occur. A wrong tooth extraction is an adverse event and irreversible, causing much distress to the patient. Replacement of the tooth thus involves cost, time and inconvenience to the patients and clinicians. A total of 6 wrong tooth extractions occurred in NDCS between 2011 to 2013, each classified as a Serious Reportable Event (SRE) [Figure 1]. As part of the Singapore Healthcare Improvement Network large scale initiative (SHINe), a surgical safety promotion team was formed by NDCS in September 2014 to look into ways to prevent wrong tooth extraction.

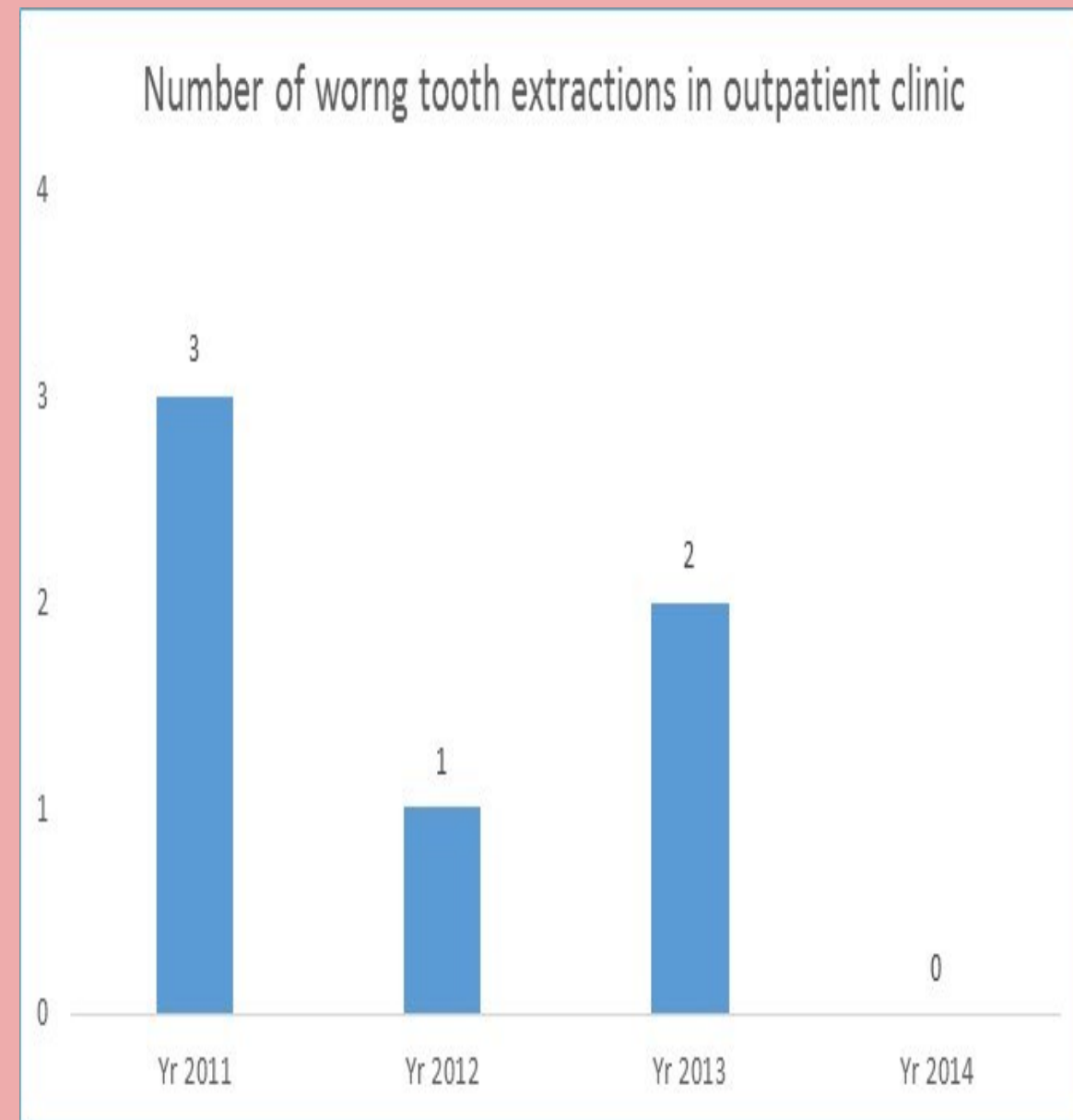


Figure 1

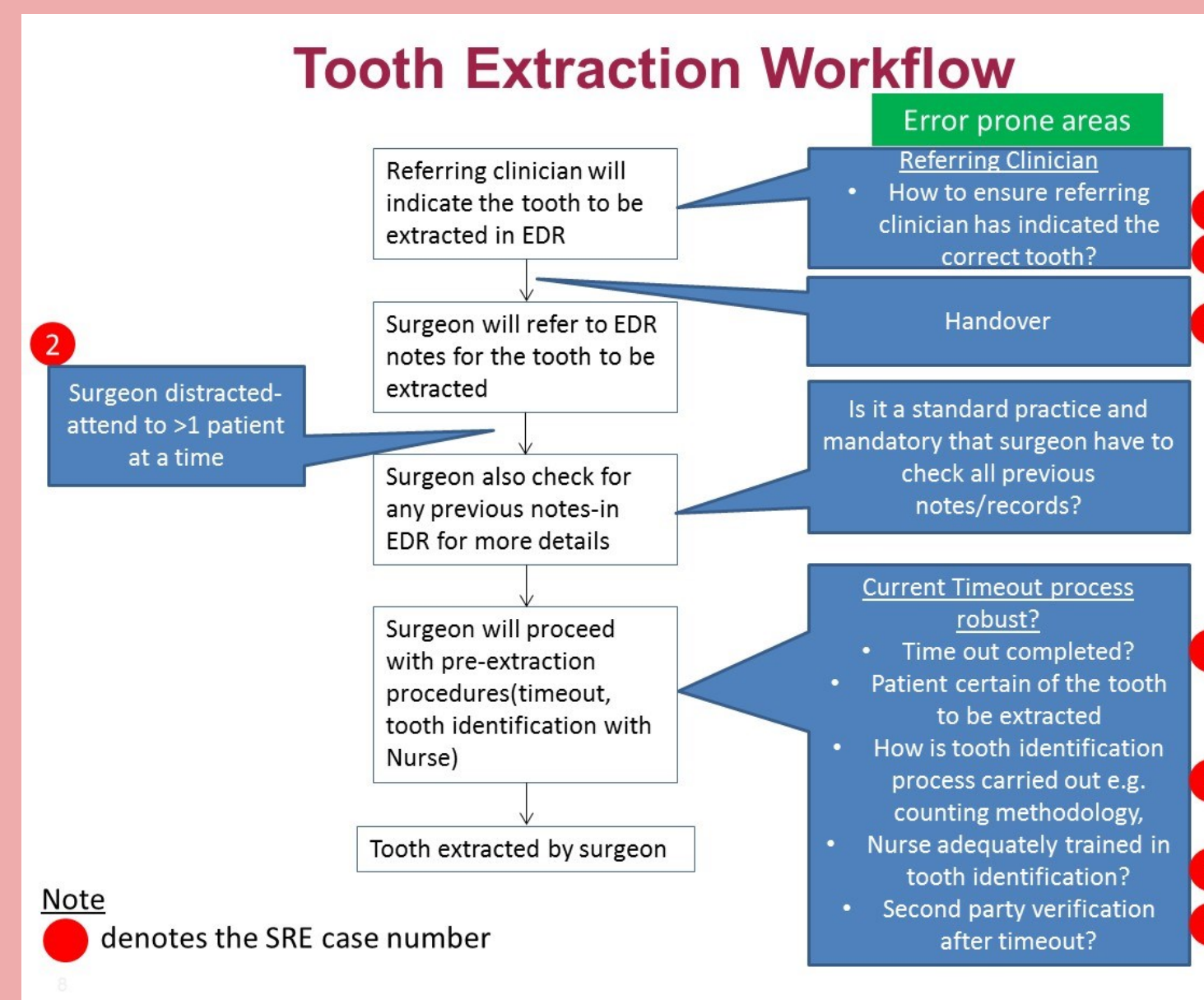


Figure 2

Methodology

The team uses the process mapping to understand a routine workflow for tooth extraction. Subsequently, ideas were piloted using Plan Do Study Act cycles² to test and learn from the results. The data was collected and as wrong tooth extraction is a rare event, the team measured the success using 'Days between the last occurred harm' and the 'Number of extractions between the extraction(last occurred harm)'.

Interventions

Due to the nature of the tooth surface, marking onto it was initially thought to be unfeasible. However, our proposed tooth site-marking using a plaque-disclosing toothpaste has proven to be effective and welcomed by NDCS clinicians and dental surgery assistants based on the survey results collected. NDCS Clinical Board approved the site-marking intervention in February 2016 and the tooth extraction policy was subsequently amended. The project and intervention was shared in the March 2016 Staff Meeting to all staff. The project is being posted on NDCS Infopedia which serves as a reminder to all staff on the importance of site marking [Figure 4].

Conclusion

The impact of our project is to ensure that with clinical tooth site-marking, a visual aid on the tooth to be extracted can be correctly identified by the clinician and verified by the dental assistant to prevent wrongful extraction. There are other dental services who have approached the team to share the practice with their clinical team. The project team will spread the intervention to other hospital dental services such as SGH, SKGH, CGH, polyclinics etc. In order for the intervention to be sustainable, continuous monitoring of compliance ought to be done. As we strive towards ZERO Harm to our patients, they will have higher trust and confidence in our safety measures. The healthcare system will then have higher culture of safety. In order for success in buy-in of any interventions, it should be cost effective, easy, practical and does not violate infection control policy.

Lessons learned

The team persevered throughout the journey in sourcing for the ideal solution and engaging the stakeholders. **Engagement with stakeholders is key to project success!**



Team composition :
[From left] Ms Teo Shao Chu, Ms Jessica Tan, Dr Chee Hoe Kit (Leader), Dr Lui Jeen Nee, Dr Nattharee chanchareonsoo, Ms Serene Tan and Ms Teo Soh Hong
Not in picture : A/Prof Andrew Tay Ban Guan (Sponsor), Ms Lorraine Johnson

Reference:
1 & 2 – The Improvement Guide, 2nd Edition by Gerald J. Langley, Ronald D. Moen, Kevin M. Nolan, Thomas W. Nolan, Clifford L. Norman, Lloyd P. Provost.

Baseline Data

83% of wrongful extractions(5 cases) happened in Outpatient clinic setting while 17%(1 case) happened in LA OT. 50% of the errors are on teeth identified for Orthodontic extraction.

Objective

To assess and enhance the current Surgical Safety practices which seek to ensure the right extraction on the right patient at the right site for every referral or indication for a tooth extraction. The team aims to achieve and maintain **ZERO** extraction error.

Our Journey

The team started by looking into the workflow for a routine tooth extraction to find out where the error prone areas that may lead to wrongful extraction Error prone areas identified [Figure 2] were :

- Wrongful indication by the referring clinician.
- Inherent risk due to patient's tooth shifted position.
- Attending clinician fail to go through patients past records-Lack of vigilance.
- **Compliance of Time-out** process in outpatient clinic.
- **No physical site marking** apart from marking onto the surgery consent form
- Dental Assistant not confident in pointing out the errors to the clinician.

Next, 'Ask 5 Take 5'¹ was carried out amongst the Dental Surgery Assistant and Dental Officers to find out their proper knowledge of the Time-out procedure. The team realized that till to date in dentistry, there is no clinical site marking done before tooth extraction. Therefore, ideas on how to site-mark teeth clinically were explored by the team. Pilot tests were done for the following with the resultant observations:

- Using dental floss to tie around the indicated tooth for extraction – *Too cumbersome.*
- Using surgical skin marker to mark on the indicated tooth clinically – *Smudging of the marker ink.*
- Using nail varnish or lipstick to mark on the indicated tooth clinically – *Not tested due to toxicity concerns.*
- An alert card with acronym "DNA-ATM" - refer to Figure 3, was also designed to remind clinicians to exercise care when referring or performing tooth extraction.

When referring for tooth extraction :

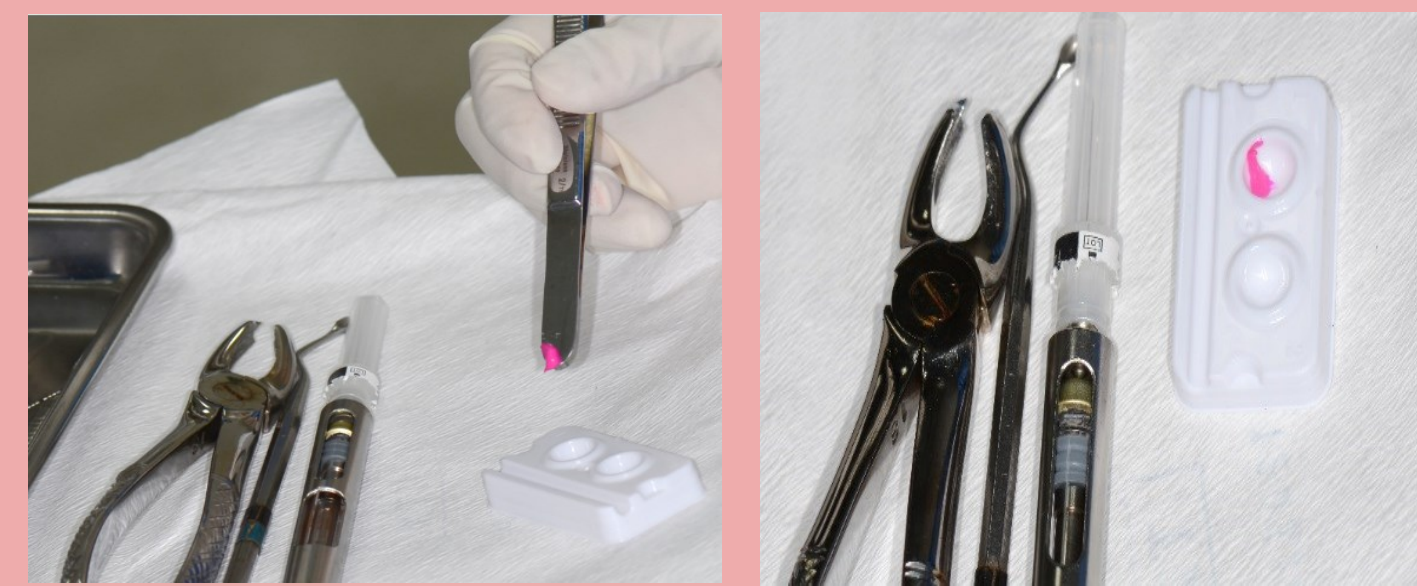
1. Describe tooth nomenclature
2. Number of tooth must be stated
3. Abnormality of tooth must be highlighted

When performing tooth extraction :

1. Ask if in doubt
2. Timeout to be performed
3. Mark the tooth where possible

Figure 3

Dispensing the plaque-disclosing toothpaste



Clinical Site-Marking using Plaque-Disclosing Toothpaste



- Before you decide not to site-mark, please ask yourself :
1. Is the tooth pristine?
 - Absence of identifying features (gross caries, large restorations)
 2. Is it drifted from its original position?
 3. Is it similar in appearance with adjacent teeth?
 - Adjacent teeth are similarly crowned, root stumps, etc.

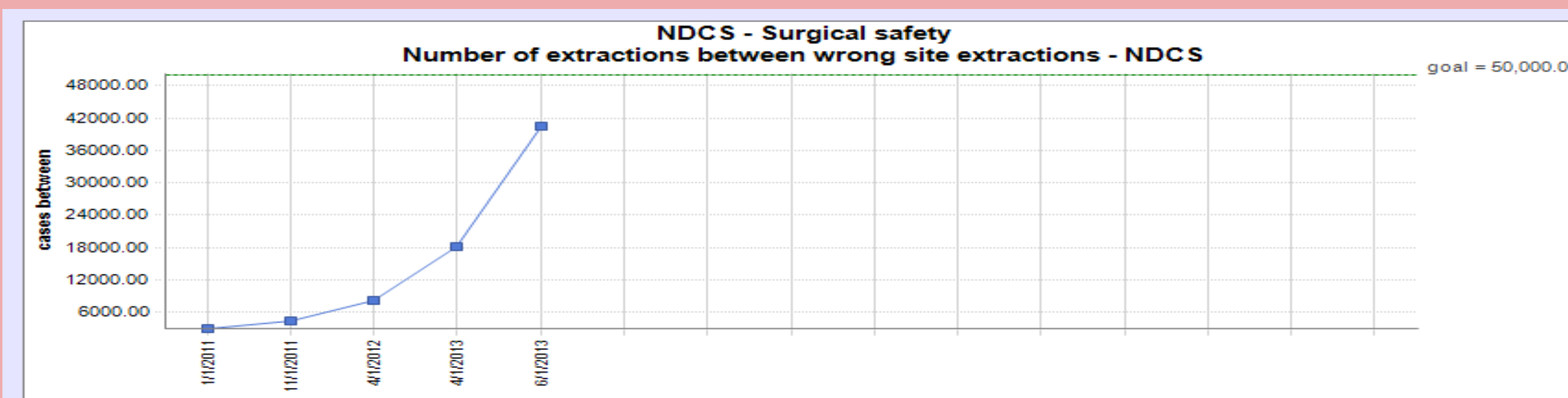
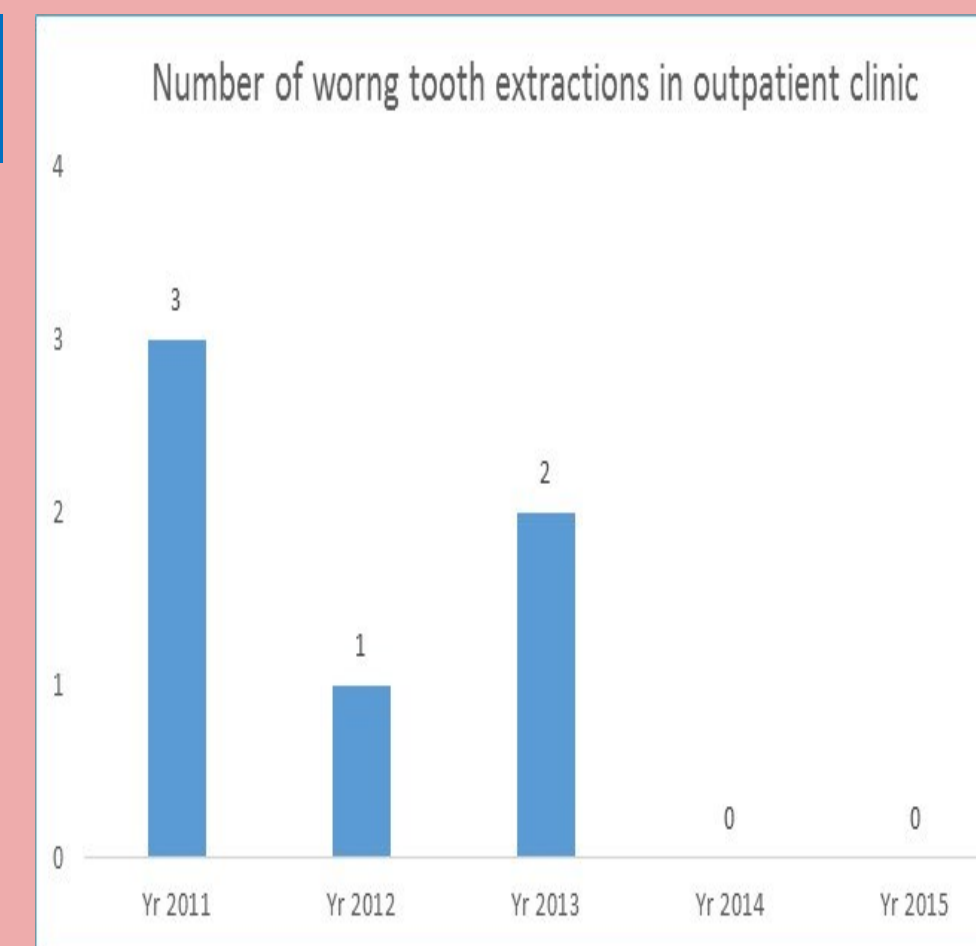
Clinical site-marking is not limited just for tooth extraction. You can apply it for any irreversible procedure such as pulpextomy/root canal treatment.

The plaque disclosing toothpaste is halal and suitable for vegetarian!

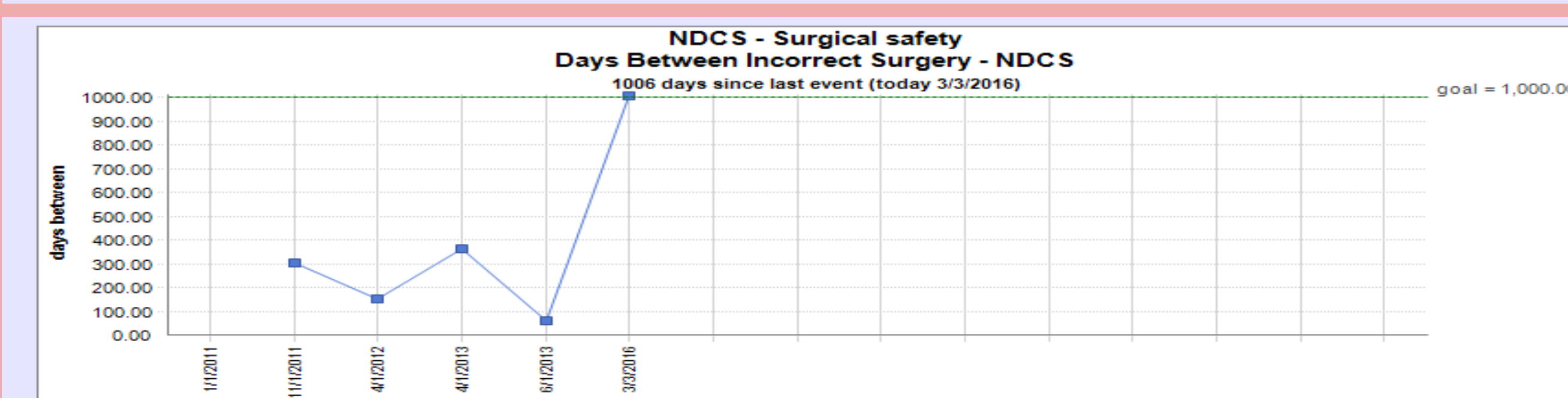
Figure 4

Results

As of end May 2016, there is **ZERO** wrong tooth extractions in outpatient clinic and the days between the last occurred harm is **1572 days** and the number of extractions between the last occurred harms(extraction) is **17384 extractions**.



Event	Cases Between	Annotation
1/1/2011	2937	Incorrect extraction happened in SOC
11/1/2011	4388	Incorrect extraction happened in SOC
4/1/2012	8214	Incorrect extraction happened in SOC
4/1/2013	18160	Incorrect extraction happened in SOC
6/1/2013	40486	Incorrect extraction happened in SOC



Event	Days Between	Annotation
1/1/2011	304	Incorrect extraction happened in SOC
11/1/2011	152	Incorrect extraction happened in SOC
4/1/2012	365	Incorrect extraction happened in SOC
4/1/2013	61	Incorrect extraction happened in SOC

Acknowledgement

The team expresses heartfelt appreciation to the SHINe faculty and Senior Management and Staff of NDCS for the successful implementation of this project.